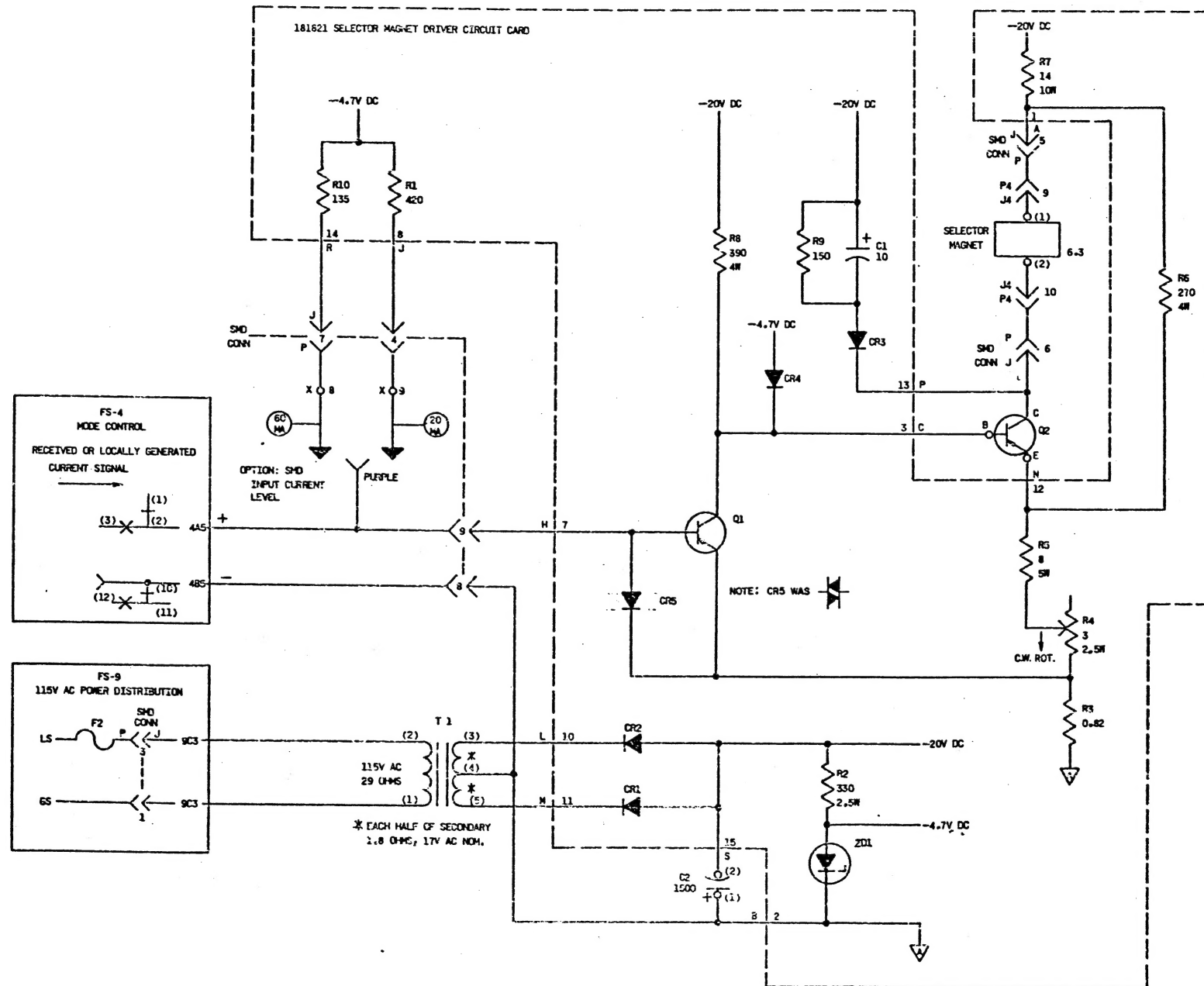


# FS-1 RECEIVE



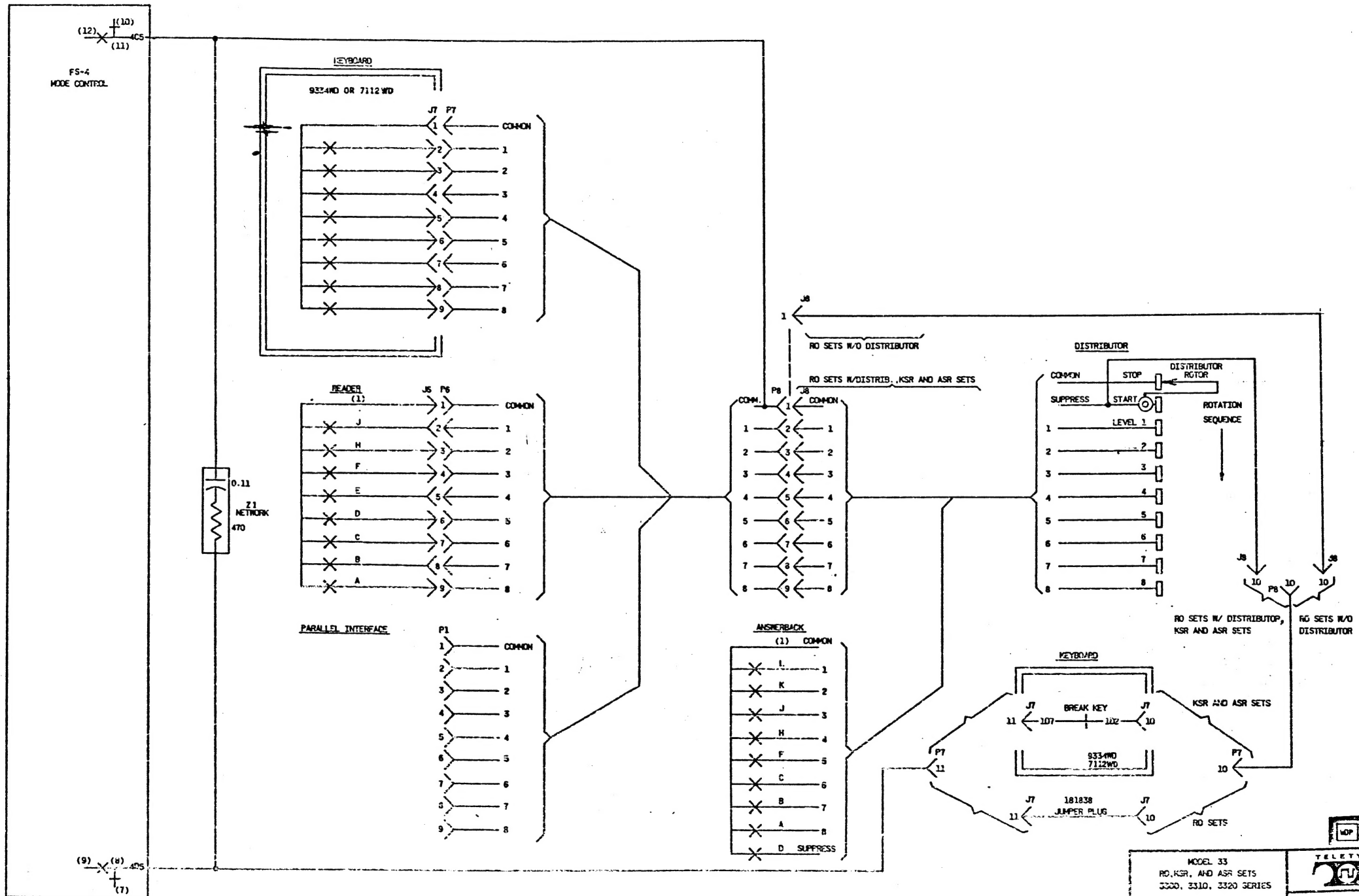
MODEL 33  
RO, KSR, AND ASR SETS  
3300, 3310, 3320 SERIES



1180 SD-91

# FS-2 SEND CIRCUIT

ISSUE  
1  
2

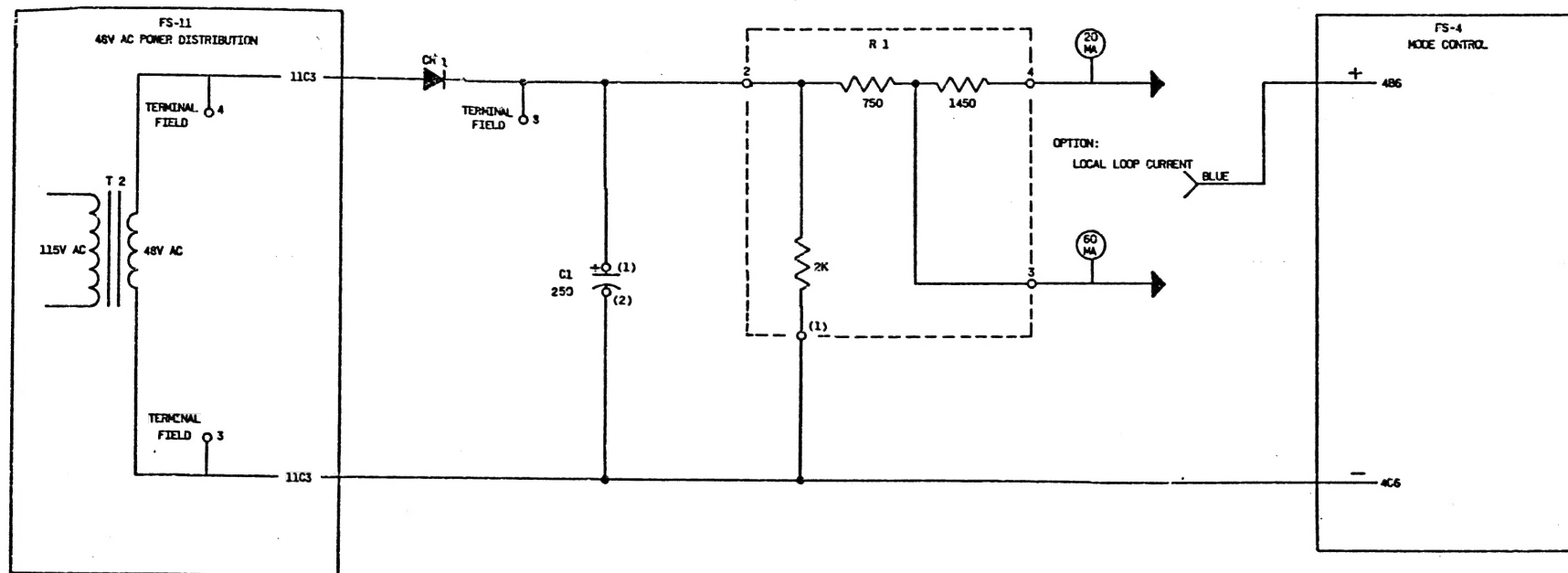


MODEL 33  
RD, KSR, AND ASR SETS  
3300, 3310, 3320 SERIES



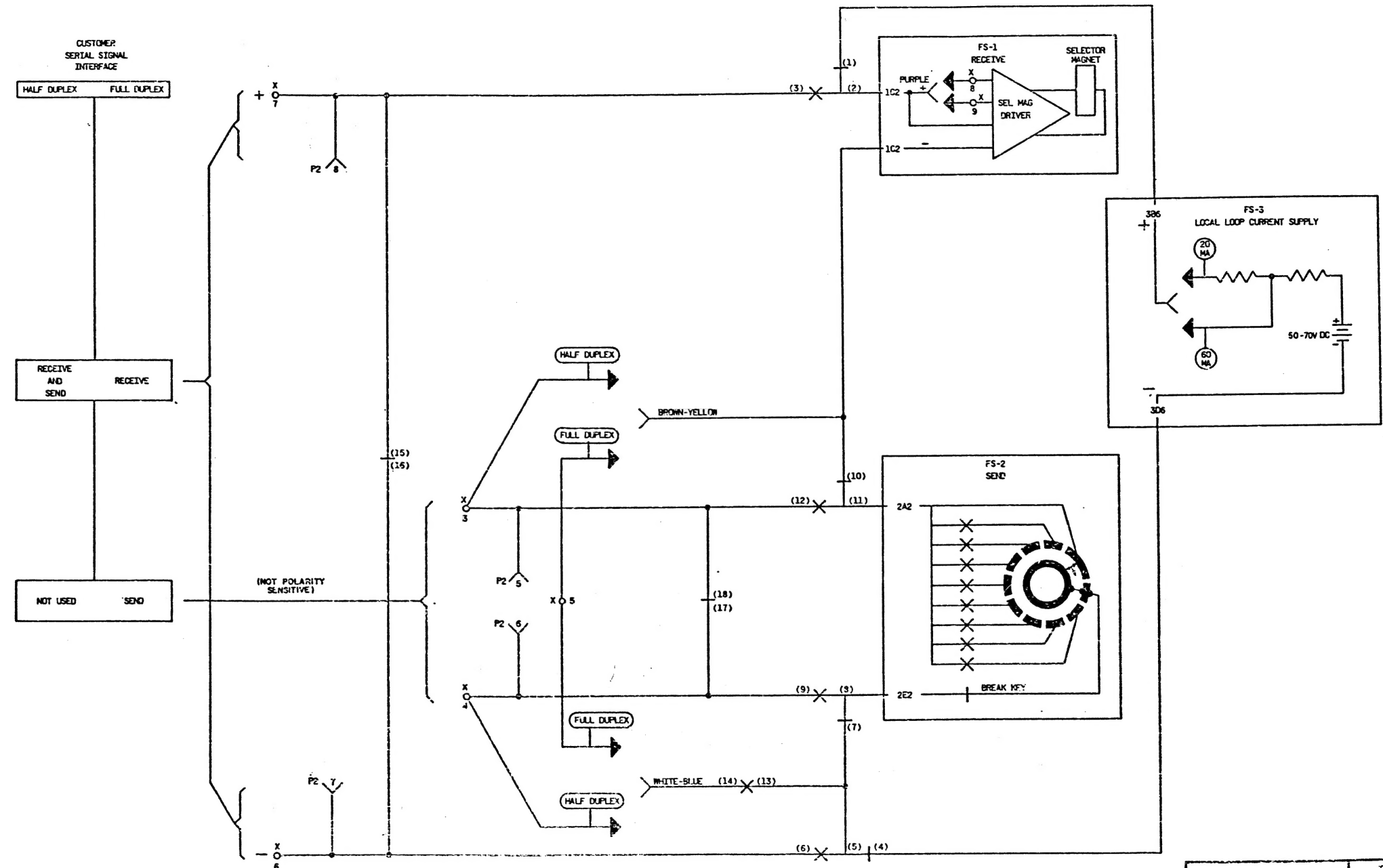
1180 SD-B2

# FS-3 LOCAL LOOP CURRENT SUPPLY



SHEET NOTES  
 1. ALL RELAY CONTACTS ON THIS SHEET ARE PART  
 OF THE MODE CONTROL RELAY.  
 COIL IS SHOWN ON 9C3.

# FS-4 MODE CONTROL



# FS-5 AUXILIARY CIRCUITS (FOR CUSTOMER USE)

ISSUE  
1  
2  
3-11-71  
5-5-71  
5-14-71

## PAPER ALARM

### PAPER FEED

FRICTION:

SPROCKET:

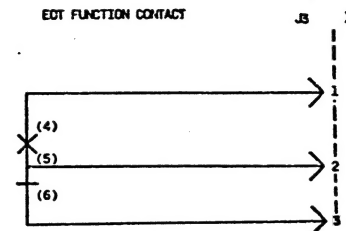
TITLE	CONDITION SIGNALLED	TYPE
LOW PAPER SWITCH	APPROX. 25 FT. OF PAPER LEFT	SNAP ACTION SWITCH
PAPER OUT CONTACT	END OF LAST FORM	CONTACT PAIR

FRICTION:

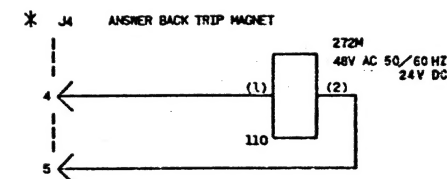
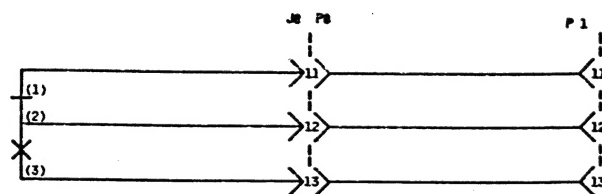
SPROCKET:

LOCATION	CONTACT RATING
IN FRONT OF MOTOR FAN	
NEAR LEFT END OF PLATEN	

### EOT FUNCTION CONTACT



PAPER ALARM  
SWITCH  
OR  
CONTACT



\* CUSTOMER ACCESS TO THE PINS SHOWN IS TO BE MADE FROM INSIDE THE CALL CONTROL UNIT BACK PLATE, USING 182644 (22-28 ANG) OR 185677 (18-20 ANG) FEMALE TERMINALS.

MODEL 33  
RO, KSR, AND ASR SETS  
3300, 3310, 3320 SERIES



1180 SD-B5

READER CONTROL  
(ASR SETS ONLY)



ISSUE
1
2

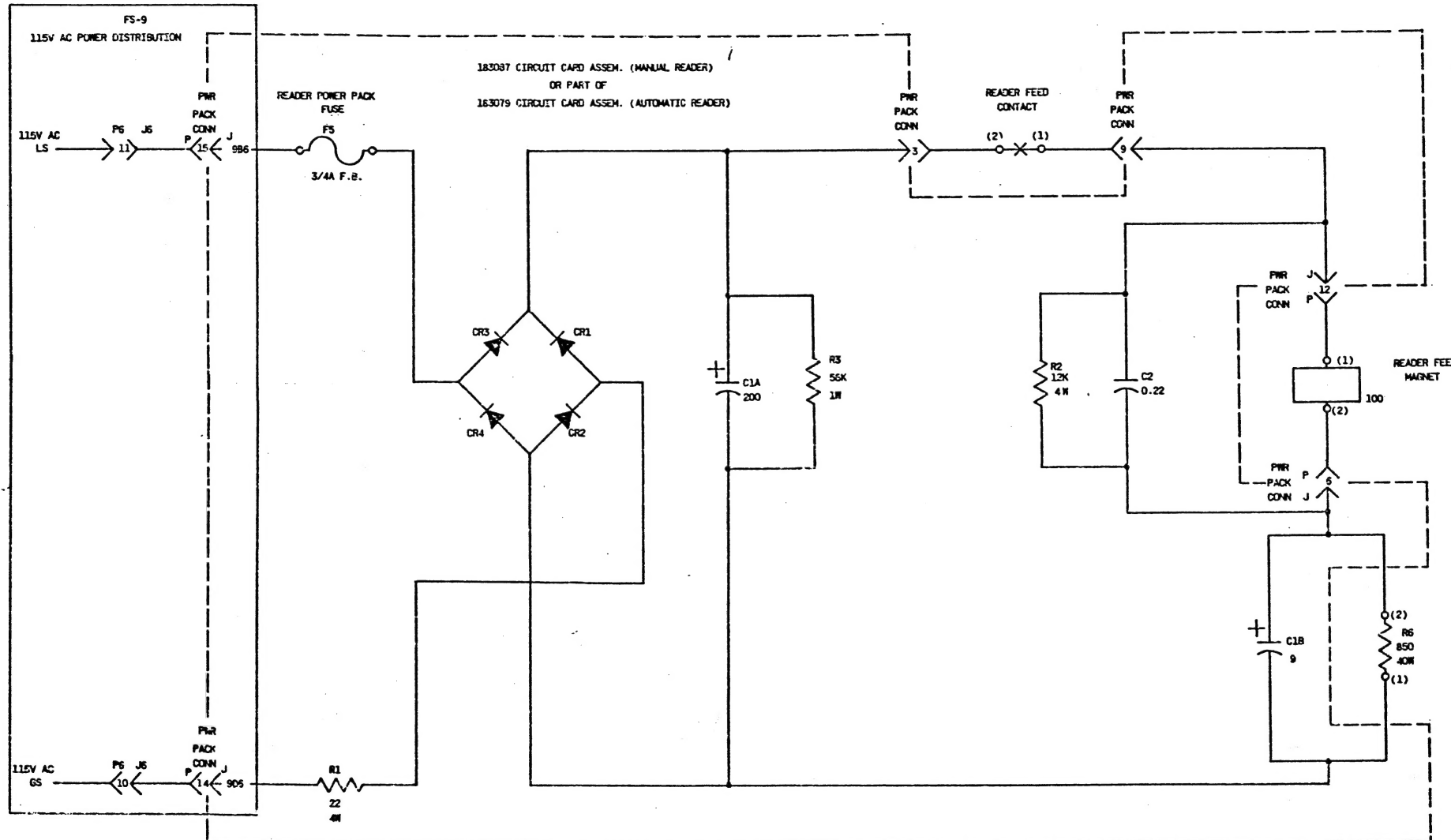


TELETYPE

TC 640 (3-69)

# FS-8 READER FEED (ASR SETS ONLY)

ISSUE  
1



MODEL 33  
RD, KSR, ASR SETS  
3300, 3310, 3320 SERIES

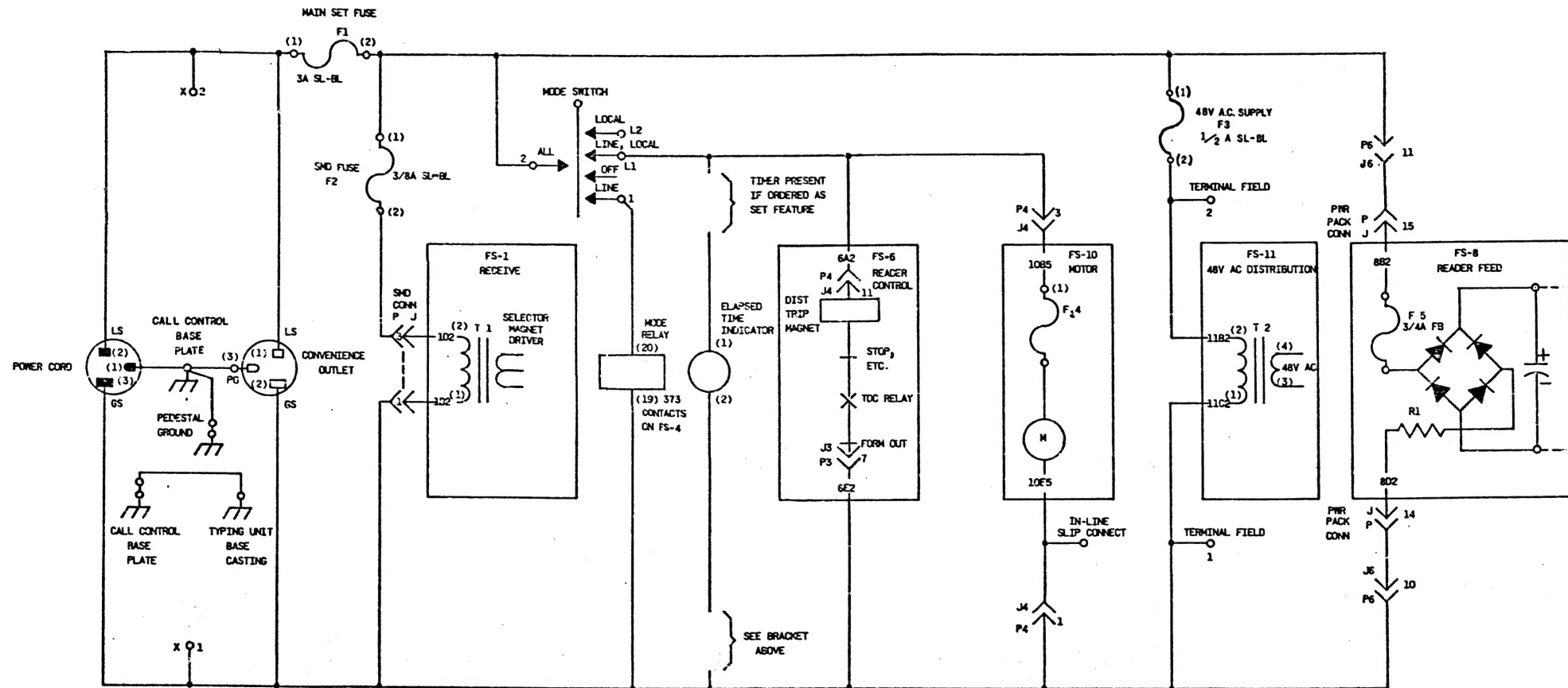


1180 SD-B8



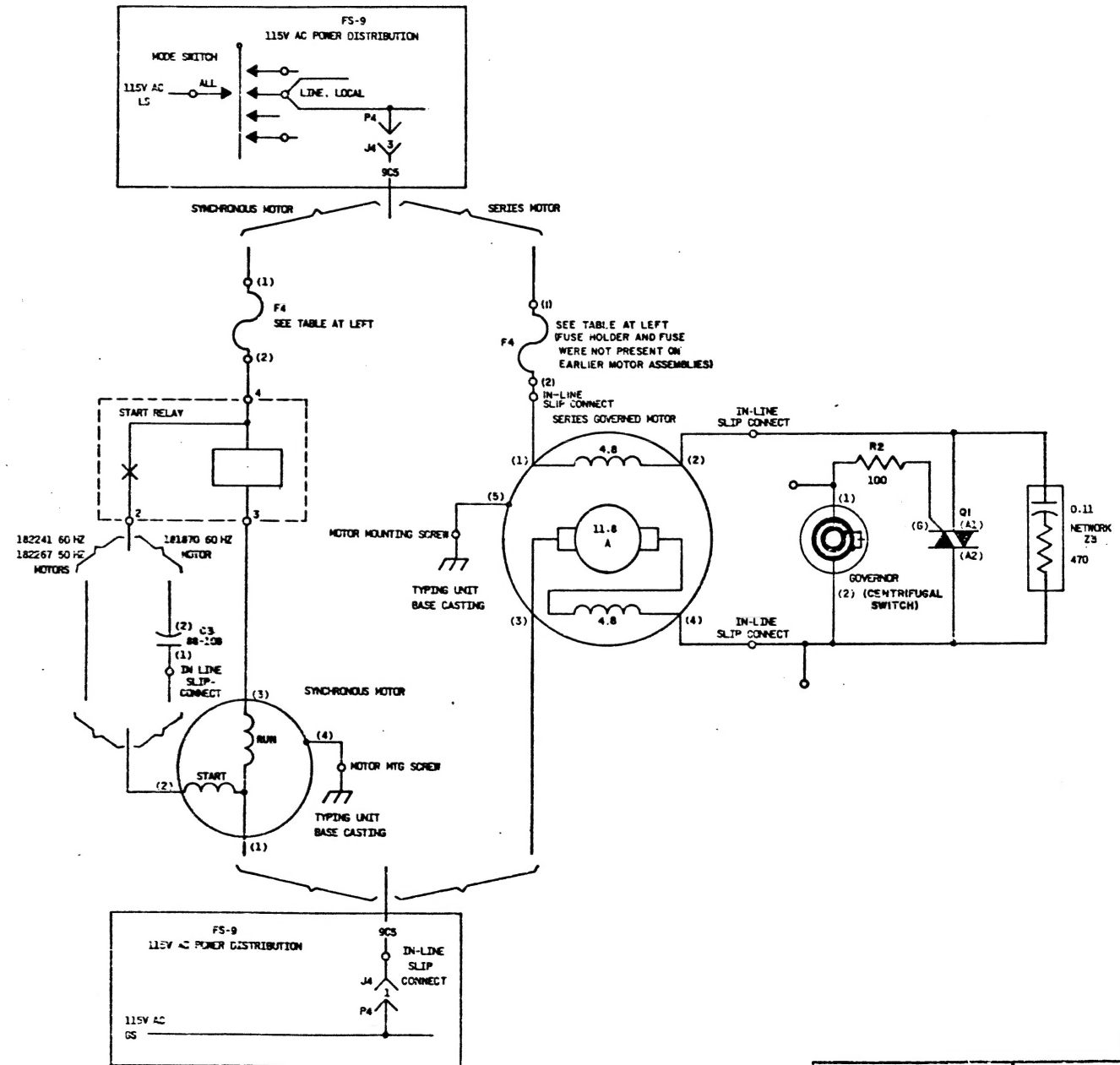
# FS-9 115VAC POWER DISTRIBUTION

ISSUE
1
2



# FS-10 MOTORS

SYNCHRONOUS MOTORS				
MOTOR PART NUMBER	FREQ. HZ	FUSE F 4	H-P	CAPACITOR
181870	60	2 1/4A SL-BL	33	88-108 MFD
182241	60	2A SL-BL	33	—
182267	50	1 3/4 A, SL-BL	35	—
SERIES GOVERNED MOTOR				
183991	50-60	1A SL-BL	83	—



MODEL 33  
RO, KSR, AND ASH SETS  
3300, 3310, 3320 SERIES

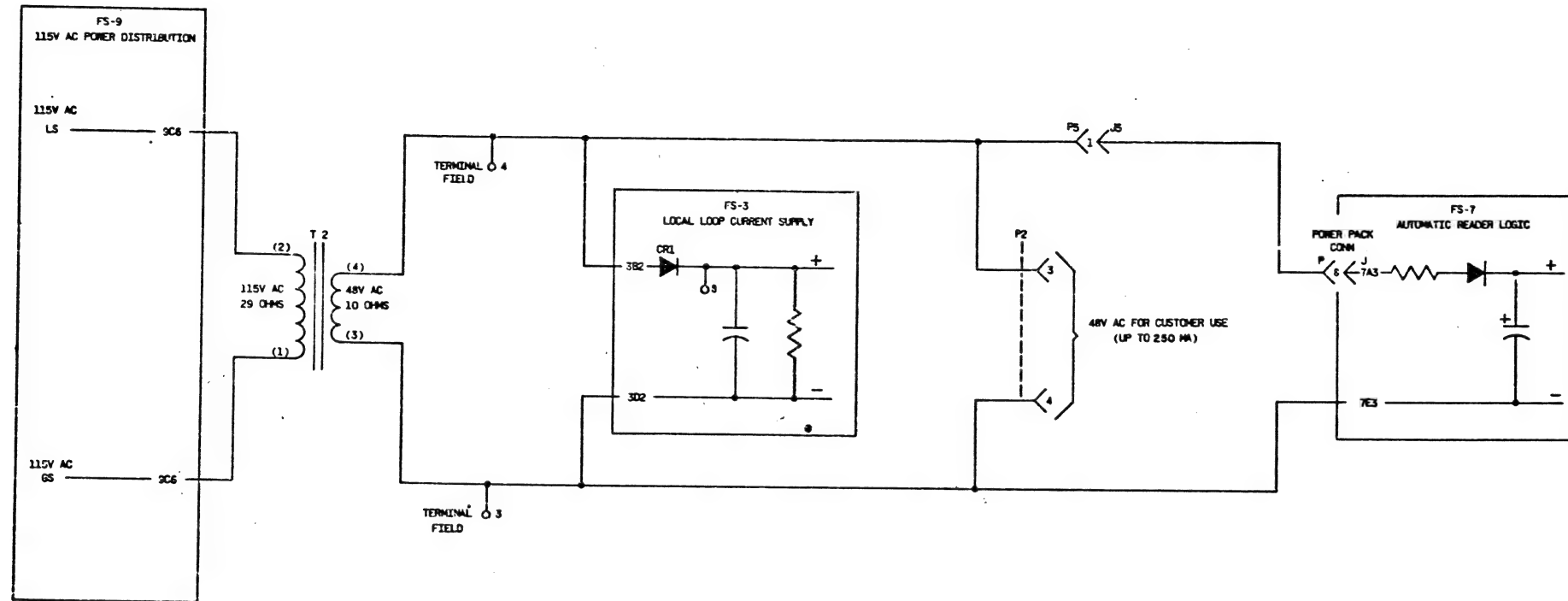


1180 SD-B10

# FS-II

## 48VAC POWER DISTRIBUTION

ISSUE
1
2



# APPARATUS FIGURES

## CAPACITORS (NOT ON CKT CARD ASSEM.)

C1 (LOCAL LOOP SUPPLY) 3C3  
C2 (SELECTOR MAG. DRIVER) 1E4  
C3 (MOTOR START) 1004

## CIRCUIT CARD ASSEMBLIES

AUTOMATIC READER 183079  
READER FEED SUPPLY SHEET 8  
ROR LOGIC 784  
MANUAL READER 183087 SHEET 8

SELECTOR MAGNET DRIVER CARD 181821		CARD SOCKET 181819
TERM.	FS/LOC	TERM.
1	1B6	A
2	1E5	B
3	1C5	C
4	-	D
5	-	E
6	-	F
7	1C4	H
8	1B3	J
9	-	K
10	1D4	L
11	1D4	M
12	1C6	N
13	1C5	P
14	1B3	R
15	1E4	S

## CONNECTORS, TITLED

READER POWER PACK CONN.  
J - CARD SIDE  
P - CABLE SIDE

TERM.	FS/LOC
MM. AND AUTO.	AUTO. ONLY
1	7C3
2	7B4
3	8B4
4	906
5	706
6	8C6
7	906
8	7B3/11C6
9	805
10	7C6
11	7C3
12	805
13	7B5
14	906
15	9B6

## SMD CONN

J = FRAME SIDE, P = CABLE SIDE

TERM	FS/LOC
1	9C3
2	-
3	9C3
4	1B3
5	1B6
6	1B6
7	1B3
8	1C3
9	1C3

## CONNECTORS NUMBERED

CONNECTOR SHELL DESIGNATION J = CABLE SIDE P = FRAME SIDE

J AND P	1	2	3	4	5	6	7	8
TERMINAL	FS/LOCATION							
1	2C3	-	5B6	9C5	11B5	2C3	2B3	2C5
2	2C3	-	5B6	-	7C6	2C3	2B3	2C5
3	2C3	11C5	-	9B5	7C6	2C3	2B3	2C5
4	2C3	11C5	-	5C5	7C3	2C3	2B3	2C5
5	2E3	4C3	-	5C5	7E4	2C3	2B3	2C5
6	2E3	4C3	6C3	-	7B6	2C3	2B3	2C5
7	2E3	4E3	6E3	-	7C6	2C3	2B3	2C5
8	2E3	4B3	6E4	-	7E5	2C3	2B3	2C5
9	2E2	-	-	1B6	7E3	2C3	2B3	2C5
10	-	-	7C6	1D6	7C6	9C6	2E6	2D7
11	5C4	-	7E6	6A3	7B6	5E6	5C6	5C3
12	5C4	-	-	6A4	-	7E4	-	5C3
13	5C4	-	7C5	-	-	6C5	-	5C3
14	-	-	7C5	-	-	6B5	-	-
15	-	-	7D4	-	-	6C5	-	-

## CONTACTS

ANSWERBACK 2C5  
BREAK KEY 2E6  
FORMING OUT FUNCTIONS 6E3  
OC1 7C5  
OC3 7C6  
ENQ 7E6  
EOT 5B5  
KEYBOARD 2B3  
PAPER OUT 9C2  
PARALLEL INTERFACE 2C6  
READER FEED 8B5  
READER (SIGNAL) 2C3  
START (AUTO READER) 7C6  
STOP (AUTO READER) 7B6  
TAPE OUT (AUTO READER) 7B6  
TIGHT TAPE (AUTO READER) 6B6  
TIGHT TAPE, TAPE OUT; STOP (MANUAL READER) 6E6

## CORD

POWER 9C1

## DIODES (NOT ON CKT. CARD ASSEMBLY)

ORL 3B3

## DISC

DISTRIBUTOR 2C5

## FUSES

F1 (MAIN) 9B2  
F2 (SHD) 9B2  
F3 (48VAC) 9B5  
F4 (MOTOR) 10B4  
F5 (READER) 9C2

## GOVERNOR

10C6

## MAGNETS

ANSWERBACK TRIP 5C6  
DISTRIBUTOR TRIP 6A3  
READER FEED 9C6  
SELECTOR 1C5

## MOTOR

SYNCHRONOUS 1C04  
SERIES GOVERNED 10C6

## NETWORKS

Z1 2C2  
Z2 6B3  
Z3 10C7

## RECEPTACLE

CONVENIENCE OUTLET 9C2

## RELAYS

MODE 9C3

## CONTACTS:

FORM	TERMS
C	1,2,3 4A5
C	4,5,6 4E5
C	7,8,9 4D5
C	10,11,12 4C5
A	13,14 4E4
B	15,16 4C3
B	17,18 4D4

## MOTOR START

10C4

## TDC (P/O 183079 CKT. CARD ASSEM.)

COIL 7A4

## CONTACTS:

1 7C3  
2 7C6  
3 6C6

## RESISTORS (NOT ON CKT. CARD ASSEM.)

R1 3B4  
R2 10C7  
R6 OF ROR PWR. PACK 8C6

## SWITCH

LOW PAPER 9C2  
MODE 9B3

## TERMINAL FIELD

TERMINAL	
1	9C6
2	9B6
3	11C3
4	11B3
5	-
6	-
7	-
8	3B3

## TERMINAL STRIP

X (CUSTOMER INTERFACE)

TERMINAL	
1	9C2
2	9B2
3	4C3
4	4C3
5	4D4
6	4E2
7	4A2
8	1C3
9	1C3

## THYRISTOR (TRIAC)

(NOT ON CKT CARD ASSEM.)

Q1 10C7

## TRANSISTOR (NOT ON CKT. CARD ASSEM.)

Q2 OF SMD ASSEMBLY 1C5

## TIMER

ELAPSED TIME INDICATOR 9C4

## TRANSFORMER

T1 SHD 1C8  
T2 48V AC 11C2

# NOTES

## CIRCUIT NOTES

### 101. FUSING

DESIGNATION	FUNCTIONAL TITLE	FUSE AMP.	POTENTIAL AT FUSE	PHYSICAL LOCATION
F1	MAIN SET FUSE	3A SL-BL	115VAC	CALL CONTROL UNIT
F2	SMO FUSE	3/8A SL-BL	"	"
F3	48VAC SUPPLY	1/2A SL-BL	"	"
F4	MOTOR FUSE	DEPENDS ON MOTOR USED. SEE SHEET 810	"	TYPING UNIT
F5	READER FUSE	3/4A SL-BL	"	READER POWER PACK AT FRONT OF CALL CONTROL UNIT

VOLTAGE SYMBOL	VOLTAGE RANGE
115V AC	103VAC TO 127VAC

FREQUENCY	FREQUENCY RANGE
60Hz SETS	$\pm 3/4\%$
50Hz SETS	$\pm 3/4\%$
50-60Hz SETS	48 TO 62Hz

### 102. OPTIONS

OPTION	FS LOC	ACTUAL LOC	FACTORY PROVIDED
* 20MA SIGNAL INPUT	1C3, 3B5	9336ND	
* 50MA SIGNAL INPUT	1C3, 3C5	1A5, 2D3	•
* HALF DUPLEX SIGNALING	4C4, 4E4	9336ND	•
* FULL DUPLEX SIGNALING		2E3	•
* EVEN PARITY KEYBOARD			•
LEVEL 8 ALWAYS MARK	2B3 AND 9334ND	9334ND	
LEVEL 8 ALWAYS SPACE			

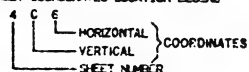
\*SELECT ONLY ONE OPTION FROM THIS GROUP

## EQUIPMENT NOTES

201. THIS DRAWING SHOWS ALL WIRING AND ELECTRICAL COMPONENTS USED ON THIS SERIES OF SETS. THE PRESENCE OF A GIVEN COMPONENT ON A PARTICULAR SET, HOWEVER, DEPENDS UPON THE FEATURES ORDERED ON THAT SET.

## INFORMATION NOTES

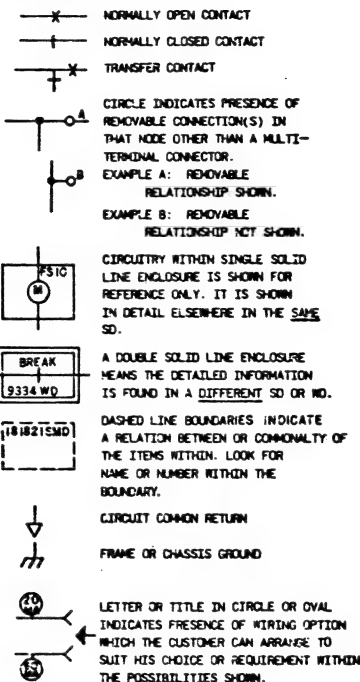
### 301. SHEET COORDINATES LOCATION LEGEND



302. ( ) TERMINAL DESIGNATIONS ENCLOSED IN PARENTHESES ARE FOR REFERENCE AND ARE NOT MARKED ON THE COMPONENT.

303. ALL RESISTANCE VALUES IN OHMS AND CAPACITANCE VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

### 304. SYMBOLS



### WIRING STATUS:

00-B B-DENOTES WIRING BEFORE THE CHANGE DESCRIBED BY THE DESIGNATED NOTE ENTERED THE PRODUCT.

00-A A-DENOTES WIRING AFTER THE CHANGE DESCRIBED BY THE DESIGNATED NOTE ENTERED THE PRODUCT.

NOTES  
GENERAL INFORMATION

ISSUE  
1

COILS

<u>NUMBER</u>	<u>272 M</u>	<u>279 M</u>	<u>300 M</u>
FUNCTION	ANSWER BACK TRIP	READER TRIP	READER TRIP
VOLTAGE RATING	48 VAC $\pm 10\%$ , 50/60 Hz 24 VDC $\pm 10\%$	48 VAC $\pm 10\%$ , 50/60 Hz 24 VDC $\pm 10\%$	115 VAC $\pm 10\%$ , 50/60 Hz
COIL RESISTANCE	110 $\Omega$ $\pm 10\%$	110 $\Omega$ $\pm 10\%$	780 $\Omega$ $\pm 10\%$ $\pm 5\%$

RELAYS

<u>NUMBER</u>	<u>178306</u>
FUNCTION	MOTOR CONTROL
VOLTAGE RATING	16-28 VDC
CONTACT RATING	1/2 HP 125-250 VAC, 8 AMPS @ 250 VAC
COIL RESISTANCE	440 $\Omega$ $\pm 10\%$
PICK UP TIME	25 ms MAX.
RELEASE TIME	16 ms MAX.
CONTACT BOUNCE	5-7 ms MAX.

SWITCHES

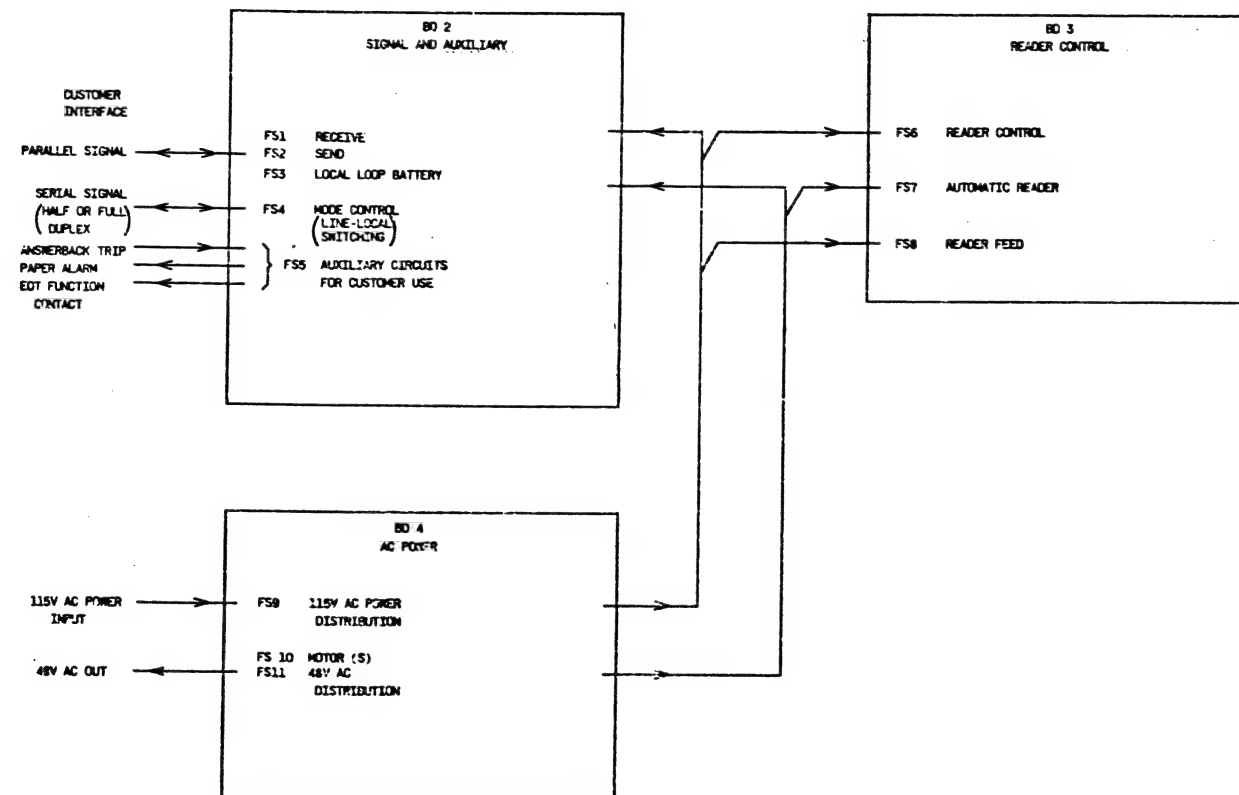
<u>NUMBER</u>	<u>182037</u>	<u>183445</u>	<u>181441</u>	<u>155954</u>
FUNCTION	FUNCTIONS DC1, DC3, EMQ & ECT	PAPER ALARM-SPROCKET FEED	PAPER ALARM-FRICTION FEED	186848 LOW TAPE MOD. KIT
VOLTAGE RATING	115 VAC 115 VDC	115 VAC 10-48 VDC	120-240 VAC 30 VDC	125-250 VAC 30 VDC
MAXIMUM CONTACT CURRENT	100 MA (INC & RES) AC 100 MA (INC & RES) DC 1/2 SPARK PROT.	2 AMPS AC 15 MA (INC) 300 MA (RES) DC	5 AMPS AC 3 AMPS (INC) 4 AMPS (RES) DC	5 AMPS (RES) AC 3 AMPS (INC) 4 AMPS (RES) DC
TIME FROM END OF START PULSE TO CONTACT OPERATION	140-150 ms	—	—	—
DURATION OF BOUNCE	3 ms	—	—	—
DURATION OF OPERATION INCLUDING BOUNCE	35-40 ms	—	—	—

MOTORS

<u>NUMBER</u>	<u>181870</u>	<u>182241</u>	<u>182267</u>	<u>183991</u>
TYPE	33 MHP, SINGLE PHASE, SYN.	33 MHP, SINGLE PHASE, SYN.	35 MHP, SINGLE PHASE, SYN.	1/12 HP, SINGLE PHASE SERIES
DESIGNED SPEED	3600 RPM	3600 RPM	3000 RPM	3600 RPM WITH SPEED REGULATOR
RATED LOAD	9 OZ. IN.	9 OZ. IN.	10.8 OZ. IN.	9 OZ. IN.
VOLTAGE RATING	115 VAC $\pm 10\%$ , 60 CYCLE	115 VAC $\pm 10\%$ , 60 CYCLE	115 VAC $\pm 10\%$ , 60 CYCLE	115 VAC $\pm 10\%$ , 50/60 CYCLE
START CURRENT	7 AMPS	11.5 AMPS	30.7 AMPS	2.5 AMPS
RUN-CURRENT-RATED LOAD	2 AMPS	1.6 AMPS	1.7 AMPS	.9 AMPS
TIME TO REACH SYNCHRONOUS SPEED-RATED VOLTAGE $\pm 10\%$	WITHIN 1 SECOND	WITHIN 1 SECOND	WITHIN 1 SECOND	WITHIN 1 SECOND
POWER FACTOR-RATED LOAD	.4 NOMINAL	.4 NOMINAL	.4 NOMINAL	.6 NOMINAL
LAG ANGLE-RATED LOAD	6 DEGREES NOMINAL	6 DEGREES NOMINAL	8 DEGREES NOMINAL	—
MINIMUM INTERVAL BETWEEN REPEATED MOTOR STARTS	20 SECONDS MIN.	20 SECONDS MIN.	20 SECONDS MIN.	20 SECONDS MIN.

# BD-1

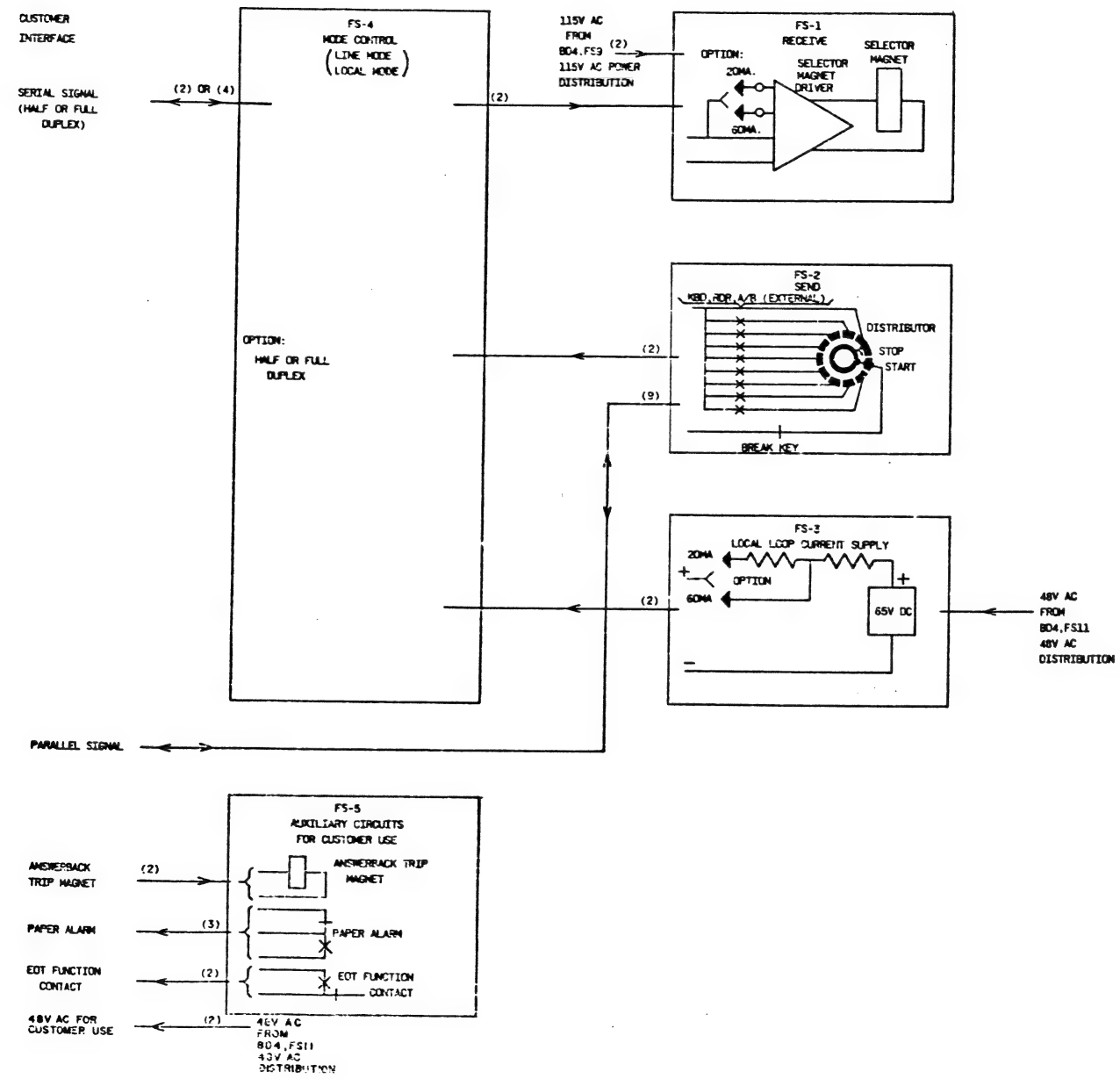
## CIRCUIT BLOCK DIAGRAM



ISSUE  
1

# BD-2 SIGNAL AND AUXILIARY

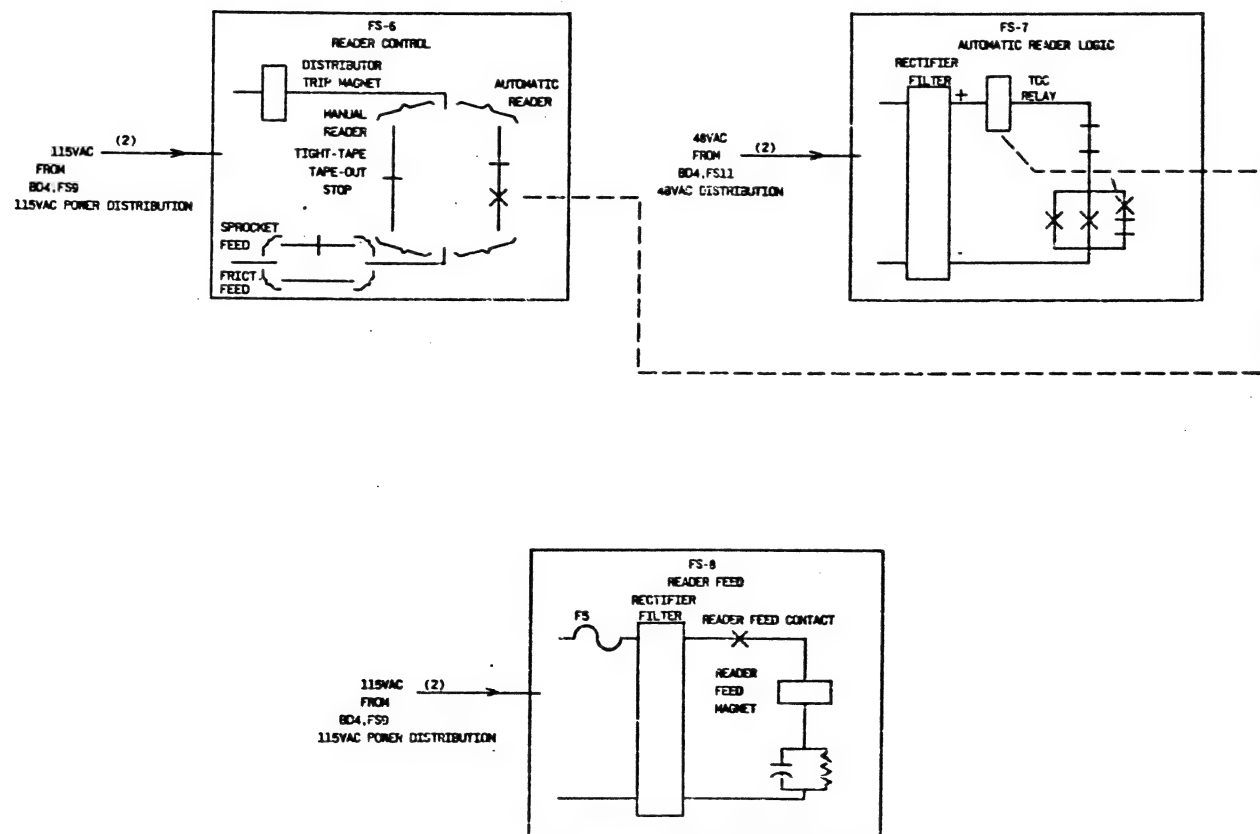
( ) INDICATES NUMBER OF WIRES  
REPRESENTED BY THE LINE BELOW.





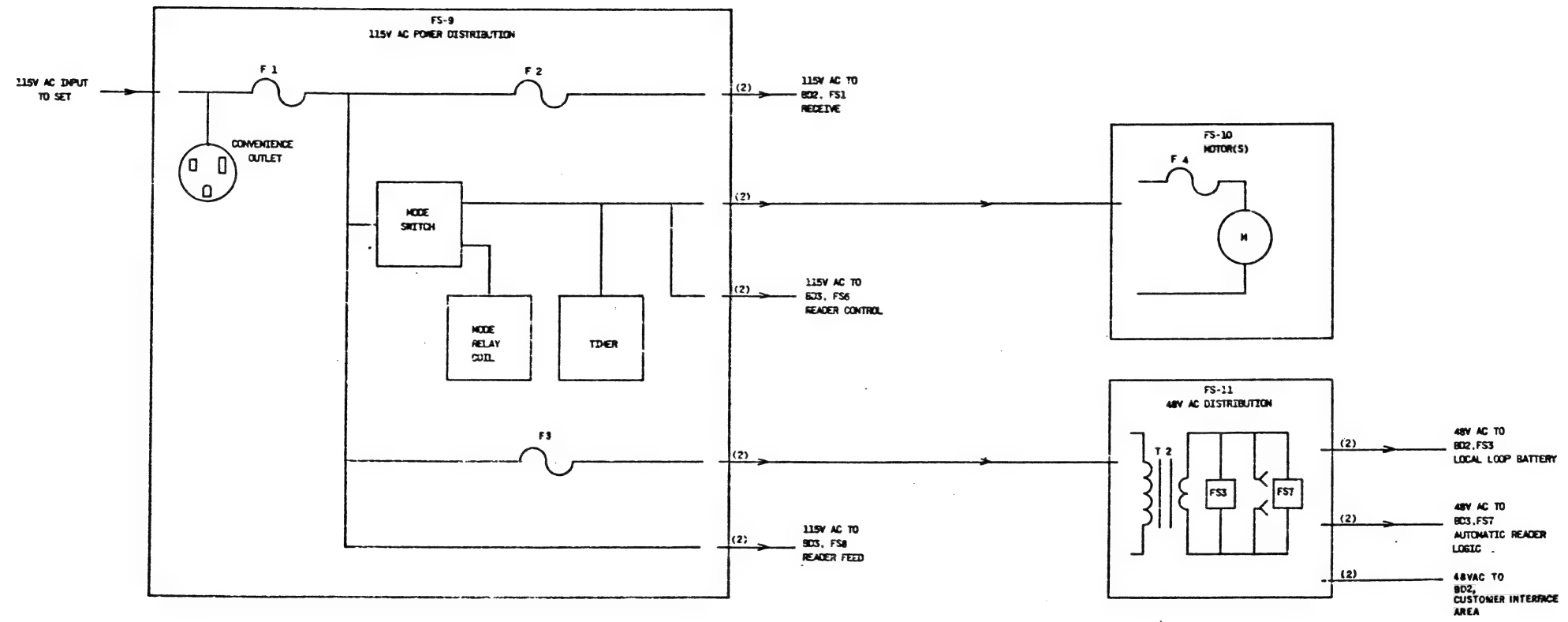
( ) INDICATES NUMBER OF WIRES  
REPRESENTED BY THE LINE BELOW.

# BD-3 READER CONTROL (ASR SET ONLY)



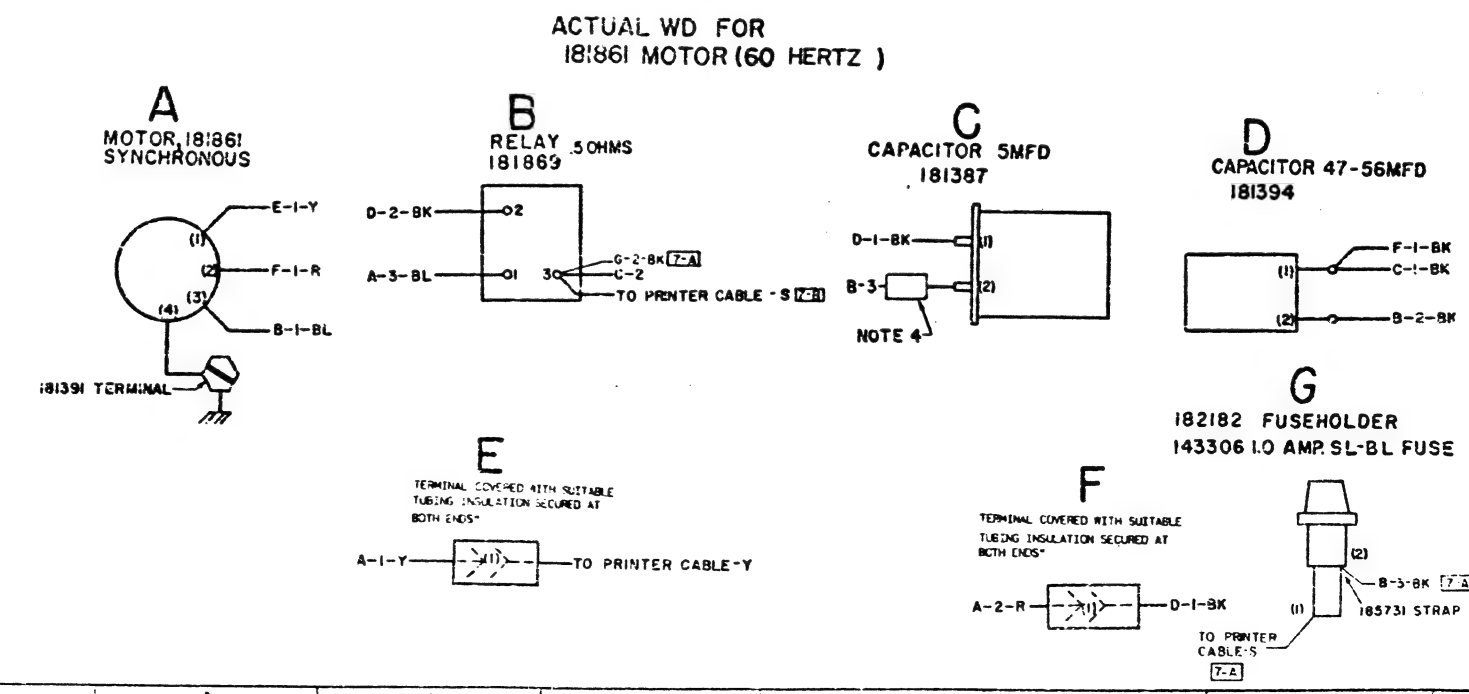
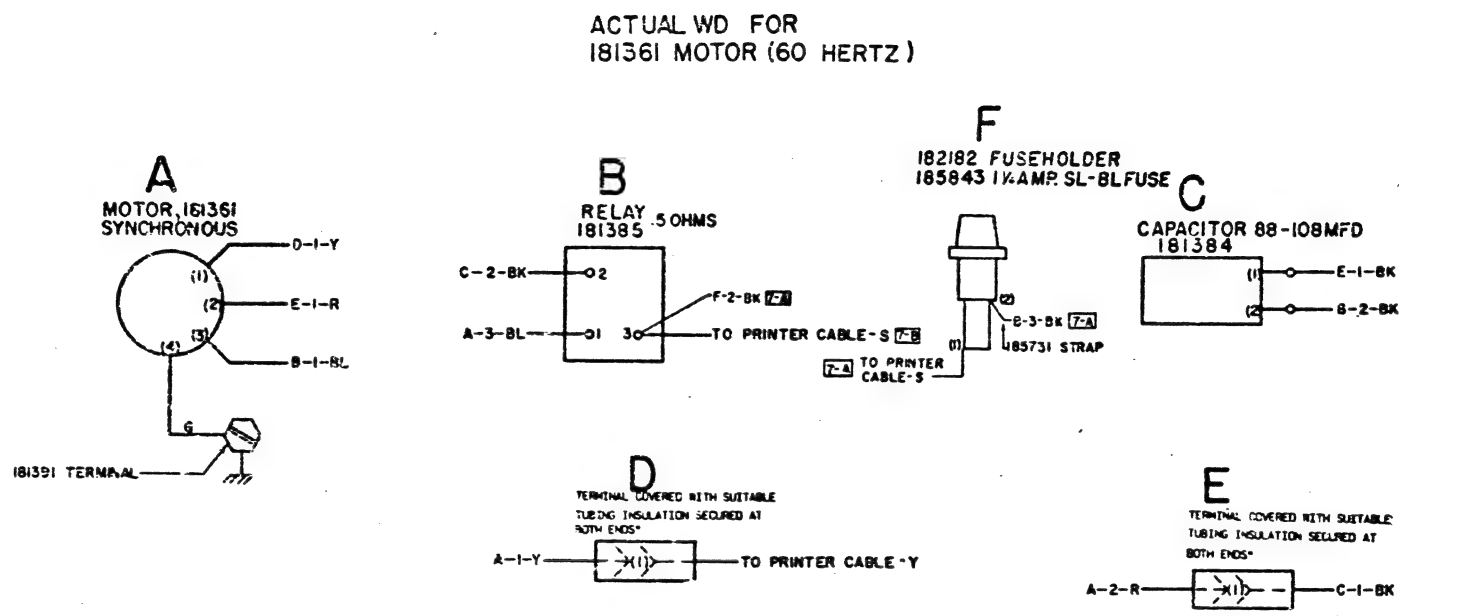
( ) INDICATES NUMBER OF WIRES  
REPRESENTED BY THE LINE BELOW.

# BD-4 AC POWER





NO.	NOTES									
1.	<div>WIRING LEGEND:</div> <div><div><div><div></div></div><div>DISTANT TERMINATING AREA</div></div><div><div><div></div></div><div>DISTANT TERMINATING DESIGNATION</div></div><div><div><div><div>A-2-W</div><div>6-B</div></div><div>NOTE-5</div><div>WIRE COLOR CODE</div></div></div></div>									
2.	<div>COLOR CODE:</div> <div><div><div>BK-BLACK</div><div>P-PURPLE</div></div><div><div>BL-BLUE</div><div>R-RED</div></div><div><div>BR-BROWN</div><div>S-SLATE</div></div><div><div>Y-YELLOW</div><div>O-ORANGE</div></div><div><div>G-GREEN</div><div>W-WHITE</div></div></div>									
3.	ASSOCIATED SCHEMATIC WNO3WO.									
4.	182272 RESISTOR-10 OHMS, 5 WATT (PART OF 181387 CAPACITOR W/RESISTOR ASSEMBLY).									
5.	<div>WIRING STATUS:</div> <div>RECTANGULAR BOX INDICATES HISTORY OF WIRING CHANGES.</div> <div><div><div><div><div></div><div>NOTE</div></div><div><div>6-B</div><div>NUMBER</div></div></div><div><div>B -</div><div>DENOTES WIRING BEFORE THE CHANGE DESCRIBED BY THE DESIGNATED NOTE ENTERED THE PRODUCT.</div></div><div><div>A -</div><div>DENOTES WIRING AFTER THE CHANGE DESCRIBED BY THE DESIGNATED NOTE ENTERED THE PRODUCT.</div></div></div></div>									
6.	<div>185731 STRAP AND FUSE ASSEMBLY NOT INCLUDED IN EARLY SETS.</div> <table><tr><th>MOTOR</th><th>FUSE VALUE</th><th>FUSE PART NO.</th></tr><tr><td>182241</td><td>2.0 AMP</td><td>138533</td></tr><tr><td>182267</td><td>1.0 AMP</td><td>320246</td></tr></table>	MOTOR	FUSE VALUE	FUSE PART NO.	182241	2.0 AMP	138533	182267	1.0 AMP	320246
MOTOR	FUSE VALUE	FUSE PART NO.								
182241	2.0 AMP	138533								
182267	1.0 AMP	320246								
7.	AA FUSEHOLDER, FUSE AND AB TERMINAL CONNECTION ADDED TO 333521 A.C. SERIES MOTOR AT ISSUE 4 OF SHEET 3.									



## 4405 WD

REVISIONS

ISSUE	DATE	AUTH. NO.
12	3-3-62	30-978
13	11-5-62	30-5330
14	1-3-63	30-5869
15	11-11-63	78856
16	5-9-64	81773
17	8-8-65	37050
18	1-13-66	898-1-3
19	3-9-66	89 2. 2
20	2-18-70	59647-4
21	8-24-70	821
22	12-9-70	2145
23	12-14-70	2220
24	9-28-76	18760

NOTE: REVISION INFORMATION MUST ALSO BE REFLECTED ON THE ISSUE CONTROL RECORD, WHICH IS A PART OF THIS DRAWING. SEE ISSUE CONTROL RECORD FOR COMPLETE LIST OF SHEETS COMPRISING THIS W.D.

SHEET 1

ACTUAL WIRING DIAGRAM FOR

FOR MODEL 32 & 33 MOTORS

APPROVALS

D AND R	E OF M

E-NUMBER

PROJ. NO. UNOS62

DATE 2-8-62

P.D. FILE NO. 1-231.15348

DRAWN

CHKD.

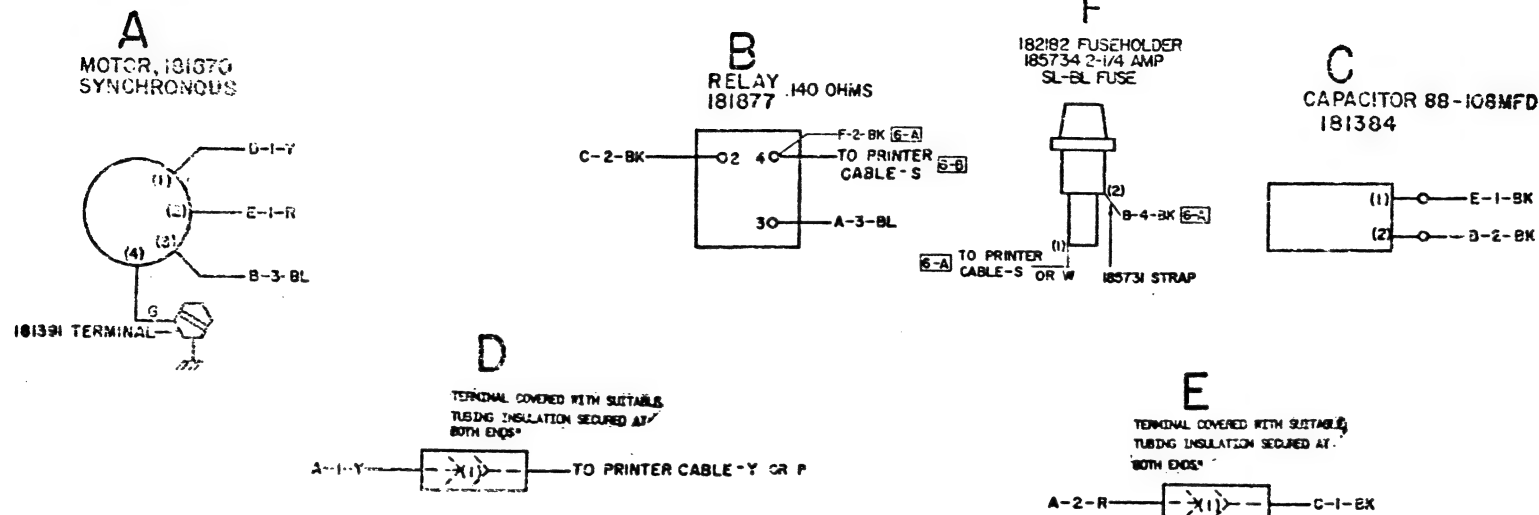
ENGR. P.R.S.

APPD.

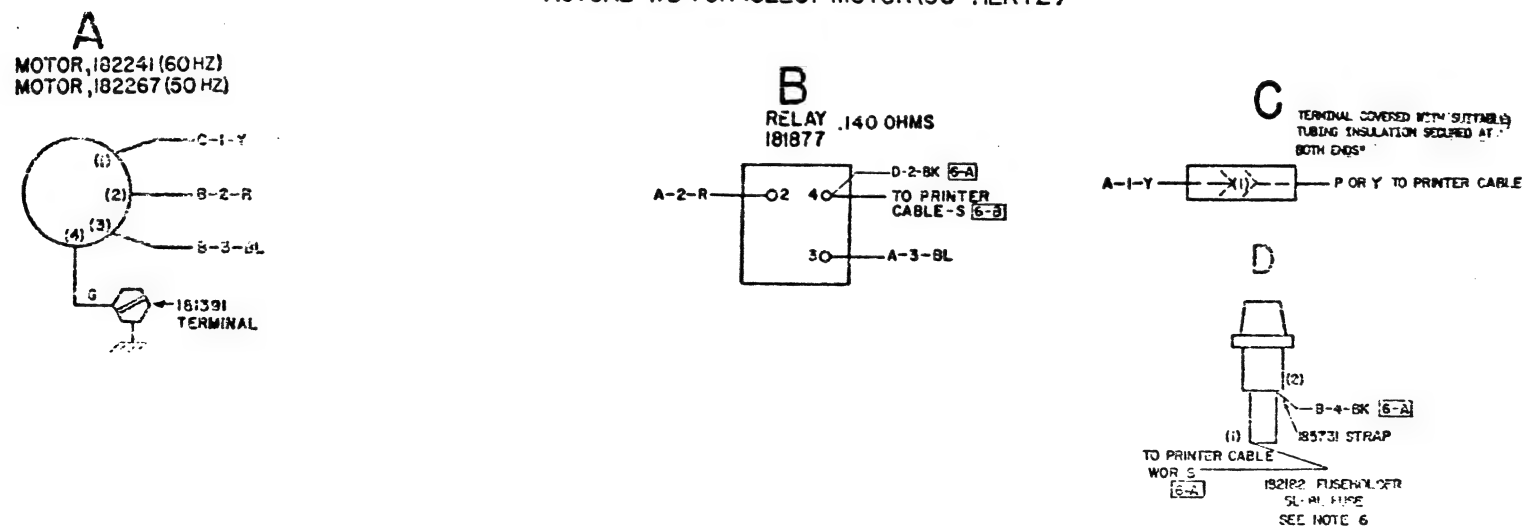
TELETYPE CORPORATION

## 4405 WD

# ACTUAL WD FOR 181870 MOTOR (60 HERTZ)



# ACTUAL WD FOR 182241 MOTOR (60 HERTZ) ACTUAL WD FOR 182267 MOTOR (50 HERTZ)



4405WD

## REVISIONS

ISSUE	DATE	AUTH. NO.
A2	3-3-62	30-978
B3	11-5-62	30-5332
E4	1-3-63	30-5869
B5	11-11-63	72255
6	6-9-64	81773
7	6-8-65	87050
8	1-13-66	88841-3
9	3-3-66	89721-2
10	2-6-67	92607
11	2-18-70	99947-4
12	8-24-70	621
13	12-9-70	2145
14	12-14-70	2220

SEE OTHER CONTROLS RECORD FOR COMPLETE LIST OF SHEETS COMPOSING THIS W.D.

SHEET 2

## ACTUAL WIRING DIAGRAM

FOR MODEL 22 & 33  
MOTORS

## APPROVALS

D AND R	E OF M
<i>[Signature]</i>	<i>[Signature]</i>

E-NUMBER

PRCD. NO. 84056

DATE 2-9-62

P.D. FILE NO. 1-231-15384

DRAWN G.H.B. CHKD.

ENGD. P.C.S. APPD.

TELETYPE  
CORPORATION

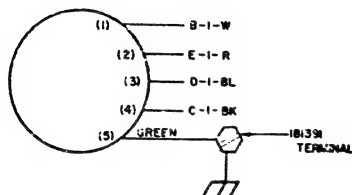
4405WD

ACTUAL WD FOR  
333521 AC SERIES MOTOR

NOTE  
REVISION INFORMATION MUST ALSO BE  
REFLECTED ON THE ISSUE CONTROL REC-  
ORD WHICH IS A PART OF THIS DRAWING

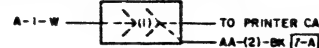
REVISIONS		
ISSUE	DATE	AUTH NO
2	12-4-70	2220
3	11-19-71	4513
4	9-27-76	16760

**A**  
SERIES MOTOR  
183991



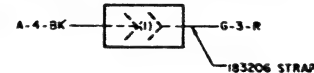
**B**

TERMINAL COVERED WITH SUITABLE TUBING  
INSULATION SECURED AT BOTH ENDS



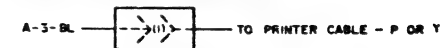
**C**

TERMINAL COVERED WITH SUITABLE TUBING  
INSULATION SECURED AT BOTH ENDS



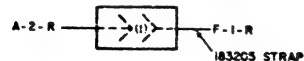
**D**

TERMINAL COVERED WITH SUITABLE TUBING  
INSULATION SECURED AT BOTH ENDS



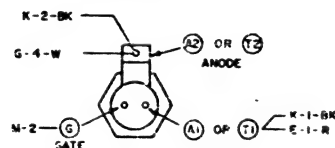
**E**

TERMINAL COVERED WITH SUITABLE TUBING  
INSULATION SECURED AT BOTH ENDS



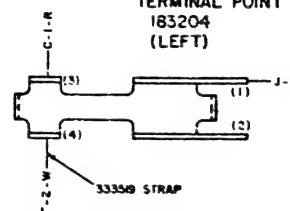
**F**

BI-DIRECTIONAL SWITCH  
336468



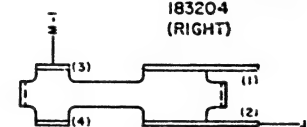
**G**

TERMINAL POINT  
183204  
(LEFT)



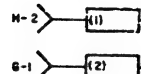
**H**

TERMINAL POINT  
183204  
(RIGHT)



**J**

BRUSH ASSEMBLY  
183207



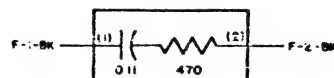
**L**

GOVERNOR ASSEMBLY  
183212



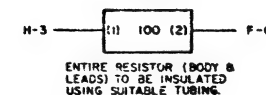
**K**

NETWORK  
153631



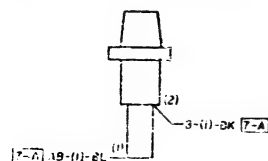
**M**

RESISTOR  
137438



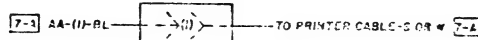
**AA**

182182 FUSEHOLDER  
143305 1.0 AMP SL-BL FUSE



**AB**

TERMINAL COVERED WITH SUITABLE  
TUBING INSULATION SECURED AT  
BOTH ENDS.



SEE 1224 - WIRING RECORD FOR COM-  
PLETE LIST OF SHEETS COMPRISING THIS

SHEET 3

ACTUAL  
WIRING DIAGRAM  
FOR MODEL 32/33  
MOTORS

APPROVALS

PROJ. SUPV.	PROJ. DIR.	MFG. REL. COMPL.
ENGR. A. S.	DESIGN. A. S.	
DRN. C. C.	DATE 0-1-70	
R&D FILE 1-131 153AA		
S-NUMBER		

TELETYPE

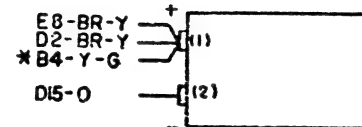


4405WD

NO	NOTES
1.	<p>WIRING CODE</p> <p>— DISTANT TERMINATING AREA</p> <p>— DISTANT TERMINATING POINT</p> <p>— COLOR CODE</p> <p>A3-BL</p>
2.	SEE 4979WD FOR SCHEMATIC WIRING DIAGRAM
3.	USE CABLE 181818
4.	* DENOTES *20 AWG WIRE. ALL OTHERS *24AWG
5.	<p>SOME 182695 UNITS CONTAIN 330793 OR 182722 TRANSFORMER AND 182696 CABLE WITH 182536 CONNECTOR.</p> <p>SOME 181815 UNITS CONTAIN 330793 OR 182722 TRANSFORMER</p>

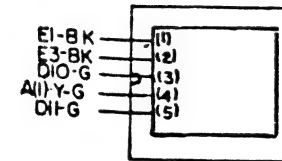
## A

### CAPACITOR FILTER (182501)



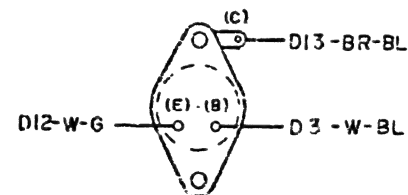
## B

### TRANSFORMER, POWER (337992) 50/60 Hz NOTE 5



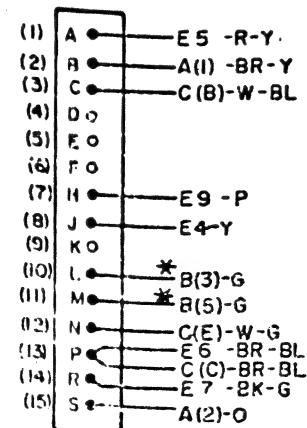
## C

### TRANSISTOR, POWER (181675)



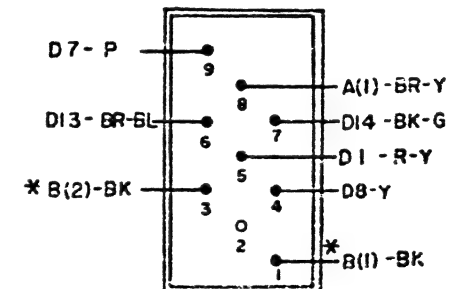
## D

### CONNECTOR, CARD (181819) NOTE 5



## E

### CONNECTOR, RECEPTACLE (182716)



4970 WD

ISSUE	DATE	AUTH NO
1	2-8-62	30-1265
2	8-5-63	77081
3	1-31-64	79903
4	5-10-68	95523-4
5	1-14-71	736

WOP

ACTUAL  
WIRING DIAGRAM  
FOR  
182695 B 181815  
SELECTOR MAGNET  
DRIVER

APPROVALS

D AND R E OF M

NUMBER

PRG. NO 4970 WD

DATE 6-22-62

PD. FILE NO 1-165,33AA

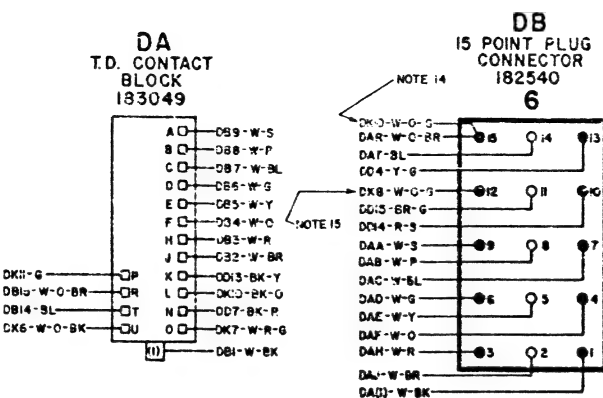
DRAWN C.A. CHKD Y.P.

ENGR P.R.S. APPD

TELETYPE  
CORPORATION

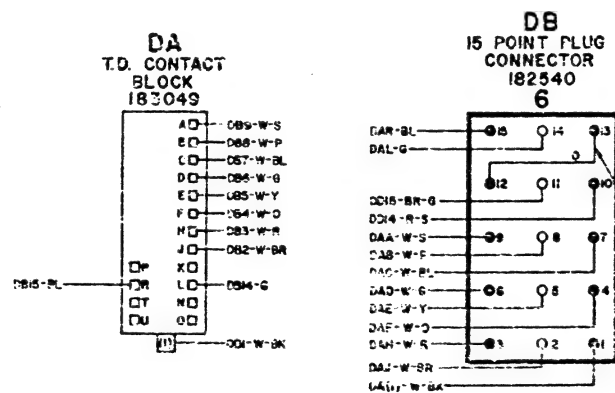
4970 WD

NO.	NOTES
1	WIRING LEGEND: D - DISTANT TERMINATING AREA D - DISTANT TERMINATING DESIGNATION C - COLOR CODE DB4-SL
2	WIRE COLOR CODE: W-WHITE BL-BLUE BK-BLACK BR-BROWN O-ORANGE P-PURPLE Y-YELLOW G-GREEN S-SLATE R-RED
3	TERMINALS DESIGNATED ( ) DO NOT APPEAR ON COMPONENT.
4	FOR TELETYPE PERSONNEL REFERENCES: SPECIFICATION 6042S
5	CONNECTORS VIEWED FROM WIRE END.
6	FOR SCHEMATIC WIRING DIAGRAM SEE 7882 WD OR S19 WD.
7	ASSOCIATED UNIT ACTUAL WIRING DIAGRAM: 7884 WD PRINTER-UP800,801,802,803,820 7885 WD KEYBOARD-UK800,804 7886 WD MOTOR 7888 WD CALL CONTROL-UC3 4970 WD SELECTOR MAGNET DRIVER 8158 WD CALL CONTROL-UC26 8160 WD PRINTER-UP836
8	OPTIONAL UX-801 AUTOMATIC READER-18307S CABLE ASSEMBLY, USED ONLY WITH UP801,803,820 PRINTER ASSEMBLIES.
9	MANUAL READER-UX800 183074 CABLE ASSEMBLY, USED ONLY WITH UP801,803 PRINTER ASSEMBLIES.
10	THESE COMPONENTS ARE MOUNTED ON UP801,803,820 PRINTER ASSEMBLIES BUT ACTUALLY ARE PART OF READER CIRCUIT. SEE PRINTER 7884 WD.
11	182592 CABLE ASSEMBLY (STRAH) NOT REQUIRED WHEN UX800 IS USED WITH EARLY STYLE (BEFORE UCC-3 WIRING CHANGED TO ACCOMMODATE UX801 FACILITIES) UCC-3 CALL CONTROL UNITS WITHOUT WIRES IN POSITION 12 AND 13 OF MATING CALL CONTROL RECEPTACLE CONNECTOR NO. 8.
12	SEE PRINTER 7884 WD FOR MODIFICATION TO UP801,803 PRINTER ASSEMBLIES TO PROVIDE AUTOMATIC READER CONTROL OPTIONS.
13	WIRING STATUS: RECTANGULAR BOX INDICATES HISTORY OF WIRING CHANGES B - DENOTES WIRING BEFORE THE CHANGE DESCRIBED BY THE DESIGNATED NOTE ENTERED THE PRODUCT. NOTE A - DENOTES WIRING AFTER THE CHANGE DESCRIBED BY THE DESIGNATED NOTE ENTERED THE PRODUCT.
14	ASSOCIATED WITH THE UX-805 ONLY.
15	THERE WIRES DO NOT APPEAR ON UX-805
16	AUTOMATIC READER UX-805 183340 CABLE ASSEMBLY.
17	275M-48VAC-110A 300M-115VAC-760A

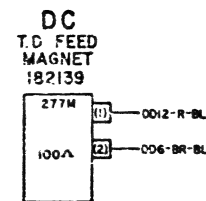


AUTOMATIC READER  
UX-801  
(SEE NOTE 8 & 12)

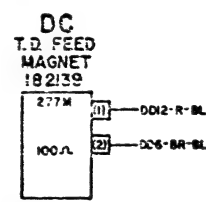
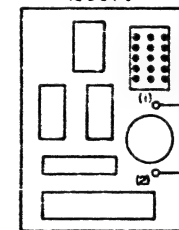
UX-805  
(SEE NOTE 14, 15 & 16)



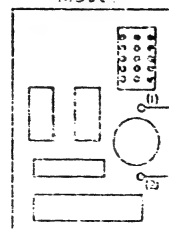
MANUAL READER  
UX-800  
(SEE NOTE 9)



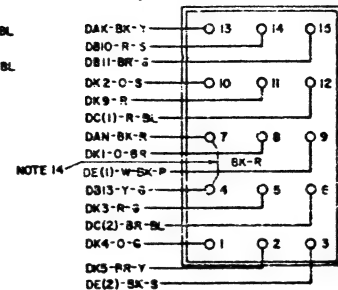
**DF**  
BOARD ASSEMBLY  
READER POWER  
PACK  
183079



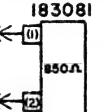
**DF**  
BOARD ASSEMBLY  
READER POWER PACK  
183087



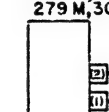
**DD**  
15 PT. RECEPTACLE  
CONNECTOR  
182539  
(TO READER POWER PACK)



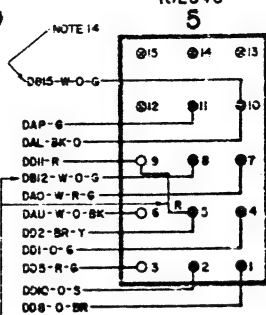
**DG**  
POWER  
RESISTOR  
183081



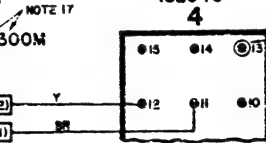
**PG**  
T.D. TRIP  
MAGNET  
279M, 300M



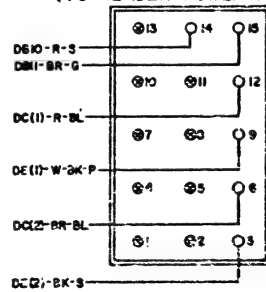
**DK**  
15 POINT PLUG  
CONNECTOR  
182540  
5



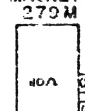
**PB**  
15 POINT PLUG  
CONNECTOR  
182540  
4



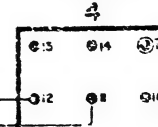
**DD**  
15 PT. RECEPTACLE  
CONNECTOR  
182539  
(TO READER POWER PACK)



**PG**  
T.D. TRIP  
MAGNET  
279M



**PB**  
15 POINT PLUG  
CONNECTOR  
182540  
4



7887 WD

REVISIONS		
ISSUE	DATE	AUTH. NO.
1	4-25-56	17470-R
2	11-3-66	92300-RC
3	1-31-68	95171
4	1-12-72	4853-RC

ACTUAL  
WIRING DIAGRAM  
FOR  
MODEL 33 5 LEVEL  
MANUAL OR AUTOMATIC  
TRANSMITTER DISTRIBUTOR  
(TAPE READER)  
UX-800-MANUAL READER  
UX-801-AUTOMATIC READER  
UX-805-AUTOMATIC READER

APPROVALS	
DESIGNED BY	ENGINEER
DATE	8-3-63
P.D. FILE NO.	G-A152AA
DRAWN BY	CHKD. JLS
ENGR.	JWS
APPR.	JWS
TELETYPE CORPORATION	

7887 WD



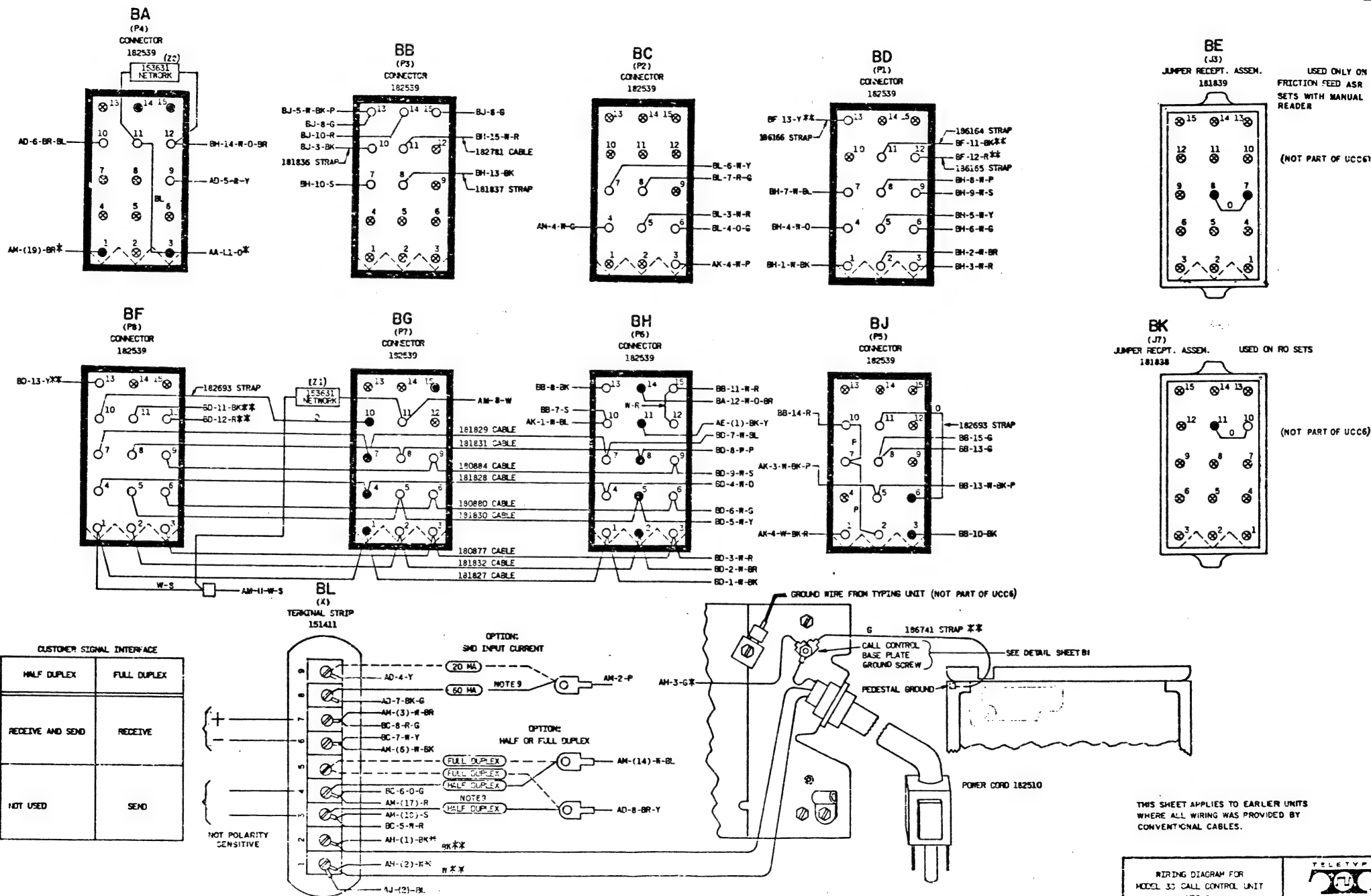






# UNITS WITH CABLE WIRING

ISSUE  
1  
2  
3  
4  
5



WIRING DIAGRAM FOR  
MODEL 33 CALL CONTROL UNIT  
UCC 6

TELETYPE  
9336WD-B2





ALL DIMENSIONS 1/8" UNLESS OTHERWISE SPECIFIED

UL RECOGNITION SYMBOL REQUIRED PER MR 2001.

# CIRCUIT CARD ASSEMBLY

## POWER PACK ASSEMBLY

NO B/M

183087

PARTS REC	NO REC	USED ON	NO REC
SEE BELOW		182134	1

### REVISIONS

ISSUE NO	DATE	AUTHOR
2	8-20-62	30-1276
3	8-26-62	30-13151
4	8-26-63	30-5537
5	8-26-63	76290
6	9-12-66	88816-1
7	11-25-66	95993
8	8-22-68	99187
9	9-17-68	99187
10	2-10-70	99187-2
11	3-3-71	2320
12	-20-72	564-2

CUSTOMER I.D.	ISSUE	VERSION	ASSOCIATED NOTE	DRAWING ISSUE	CONFORMANCE DATE	AUTH NO.
13	B	4	14			12174

WDP

### APPROVALS

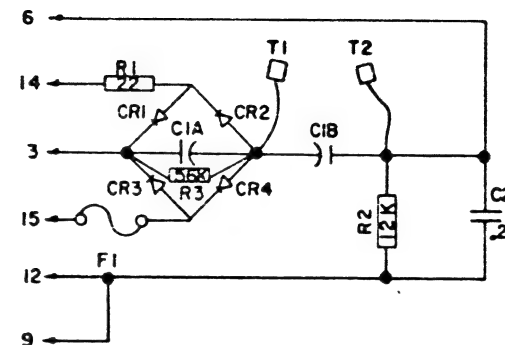
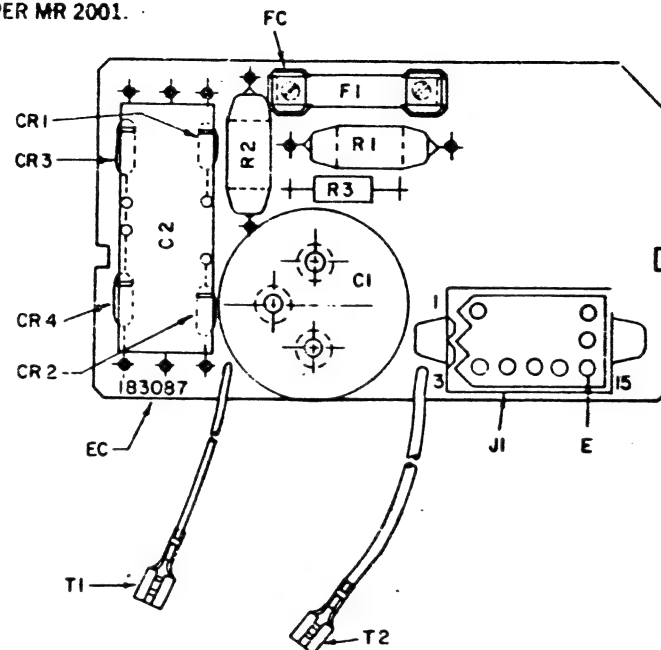
D AND R	E OF M
7	

E. NUMBER  
PROGNO 183087

TELETYPE CORPORATION

183087

NO.	NOTES
1	MASTER ARTWORK 183087AW FOR PRINTED SCREENING AVAILABLE IN R&D OFFICE SERVICE SECTION.
2	SOME PREVIOUS CIRCUIT CARD ASSEMBLY USED 1/2 AFB 3/4 AFB IS PREFERABLE.
3	ON ISSUE 10, BOARD NUMBER WAS 183080.
4	FOR STANDARDIZATION CR1-4 WERE CHANGED FROM 181-654.



DESIGNATION	TELETYPE PART NO	TOTAL QTY	DESCRIPTION	FUNCTION
R1	183083	1	RESISTOR, 22 OHM	SURGE LIMITER
R2	183082	1	RESISTOR, 12,000 OHM	ARC SUPPRESSOR
C1	183078	1	CAPACITOR, DUAL SELECTION A-200M.F.D. 200 V.D.C. B-9 M.F.D. 200 V.D.C.	POWER SUPPLY FILTER
C2	183084	1	CAPACITOR, 22M.F.D.	SURGE SOURCE
CR1	312341	4	DIODE, 400 V. (NOTE 4)	ARC SUPPRESSOR
CR2			"	POWER SUPPLY RECTIFIER
CR3			"	"
CR4			"	"
F1	143630	1	FUSE, 3/4 A. FB	POWER SUPPLY PROTECTION SEE NOTE 2
FC	171595	2	FUSE CLIP	
T1	183085	2	TERMINAL WITH WIRE LEAD	
T2			"	
J1	182540	1	CONTACT BLOCK, 15 POINT	
E	182641	8	TERMINALS MALE PC.	
EC	183137	1	ETCHED CIRCUIT BOARD	NOTE 3
	151637	2	SCREW 4-40 FIL HEAD	
	110743	2	LOCK WASHER #4	
	151880	2	NUT	
R3	118198	1	RESISTOR, 56,000 OHM	BLEEDER

THIS POWER PACK CONSISTS OF A 150 VOLT POWER SUPPLY OPERATING DIRECTLY FROM THE 117 VAC LINE. A WAVE SHAPING NETWORK AND AN ARC SUPPRESSOR IT IS DESIGNED TO OPERATE WITH AN INDUCTIVE LOAD OF APPROXIMATELY 100 OHMS BETWEEN TERMINALS 6 AND 12 WITH A 850 OHM 40WATT RESISTOR CONNECTED BETWEEN T1 AND T2.

AN ON-OFF CONTROL SWITCH IS CONNECTED BETWEEN TERMINALS 9 AND 3. THE UNIT IS DESIGNED TO DRIVE THE READER MAGNET IN THE MODEL 32 AND 33 ASR.

SCALE: 1/1

STOCK SPECIFICATION

DRAWN	PD FILE NO	DATE
TR	1-4760AA	6-7-62
DESIGNED	ENGINEER	CHECKED
JAU	44	2/1/63

SIZE	KIND	SHAPE	TEMPER

SEE SHEET 1 FOR NOTES

NOTE  
REVISION INFORMATION MUST ALSO BE  
REFLECTED ON THE ISSUE CONTROL REC  
ORD WHICH IS A PART OF THIS DRAWING

6353WD

## REVISIONS

ISSUE	DATE	A/TM NO.
2	11-20-63	266
3	1-8-64	734
4	4-9-64	140
5	6-9-64	113
6	11-27-64	6672
7	2-1-65	119
8	1-4-65	118
9	6-5-65	118
10	10-15-65	118B
11	12-17-65	7122
12	1-13-66	118B-13
13	2-17-66	90357
14	3-9-66	89721
15	3-29-66	91790
16	3-2-66	90374
17	5-10-66	9031
18	12-1-66	90371
19	10-19-66	90371
20	12-28-66	929
21	12-18-67	90474

SEE ISSUE CONTROL RECORD FOR COMPLETE LIST OF SHEETS COMPOSING THIS  
W 9

SHEET 5

SCHEMATIC  
WIRING DIAGRAM  
FOR  
MODEL 33  
299, KSR, RO  
DC SIGNAL LINE

APPROVAL 9

D AND R	K OF M
---------	--------

E - POLYMER 10

PROD. NO. 6393 WD

DATE 4 23 67

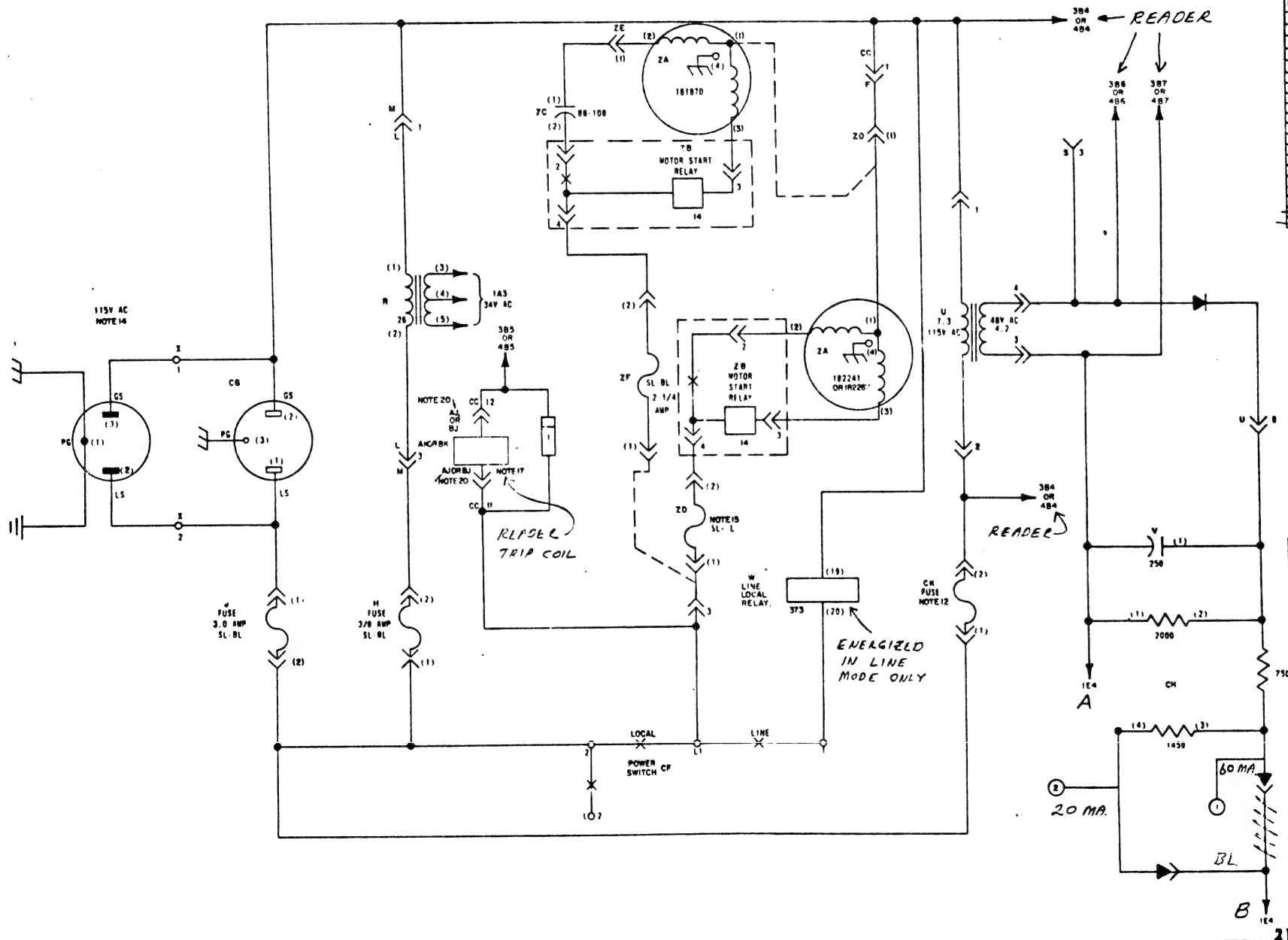
P.O. FILE NO. 2-50152/15114

DRAWN JR	CHD
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ENGD. A 8	APPQ
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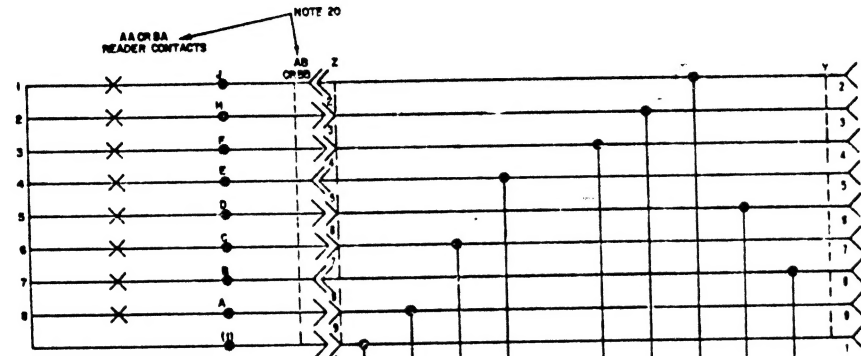
TELETYPE

6353WD



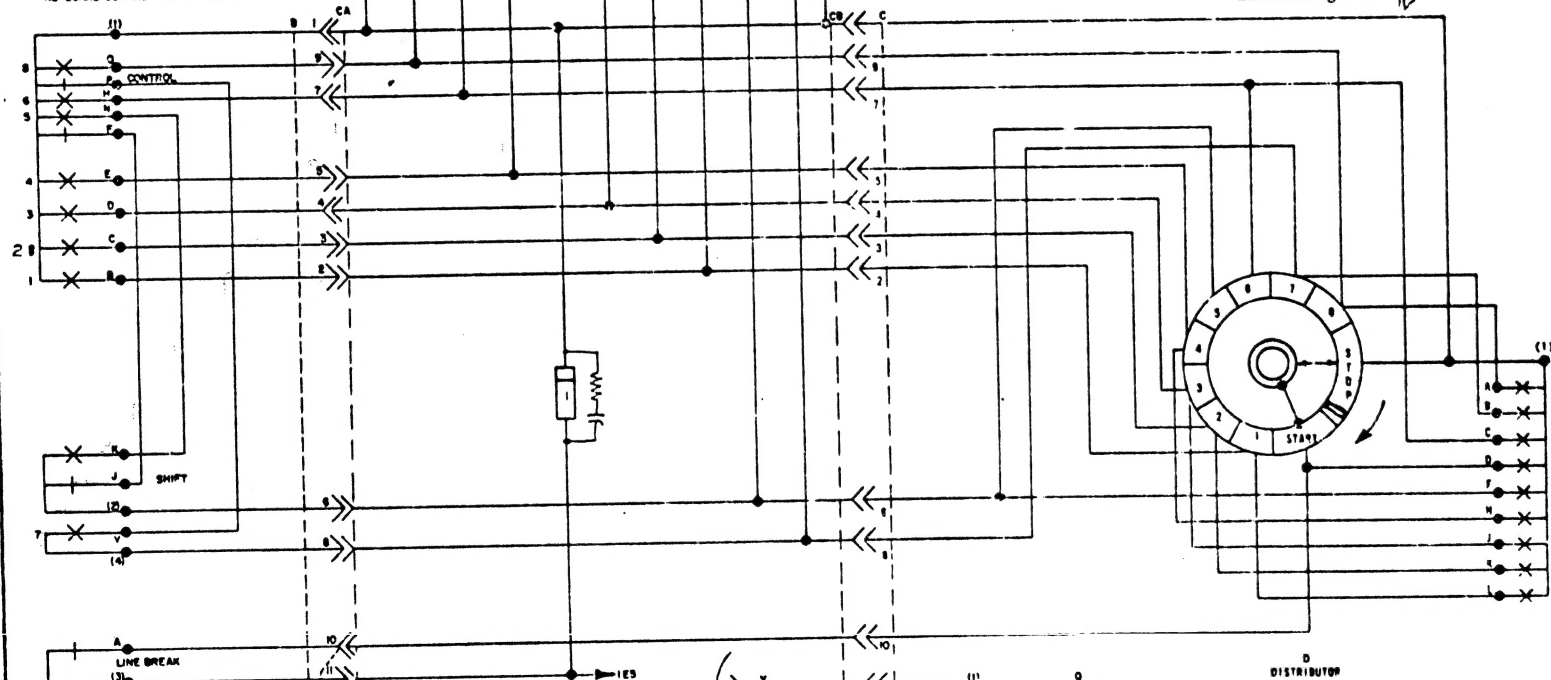


SEE SHEET 1 FOR NOTES



SPARE  
FOR CUSTOMER'S  
OPTION

KEYBOARD CONTACT ARRANGEMENT



RO SETS ONLY

NOTE 19

NOTE 21

PAPER OUT  
ALARM

NOTE 18

NOTE 11

NOTE: REVISION INFORMATION MUST ALSO  
BE REFLECTED ON THE ISSUE CONTROL  
RECORD, WHICH IS PART OF THIS W.D.

KA AND KC  
PARITY KEYBOARD CONTACT  
ARRANGEMENT

6353WD

# REVISIONS

ISSUE	DATE	AUTH. NO.
1	11-20-63	79268
2	1-9-64	79934
3	4-9-64	8460
4	6-9-64	8773
5	11-27-64	84602
6	2-12-65	84127
7	3-2-65	84127
8	3-2-65	84127
9	3-2-65	84127
10	3-2-65	84127
11	3-2-65	84127
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14	3-2-65	84127
15	3-2-65	84127
16	3-2-65	84127
17	3-2-65	84127
18	3-2-65	84127
19	3-2-65	84127
20	3-2-65	84127
21	3-2-65	84127
22	3-2-65	84127

SEE ISSUE CONTROL RECORD FOR  
COMPLETE LIST OF SHEETS  
COMPRISING THIS W.D.

SHEET 2

SCHEMATIC  
WIRING DIAGRAM  
FOR  
MODEL 33  
ASR, HSP, MO  
DC SIGNAL LINE

APR: RC WALS

D AND R E OF M

E-NUMBER

PROD. NO. 6353WD

DATE 4 12 67

P.D. FILE NO. 2 30 152 10388

DRAWN JR CWD

EMBO 65 APPS

TELETYPE  
CORPORATION

6353WD

NO.	NOTES									
1	FOR ACTUAL WIRING DIAGRAM SEE 8354WD									
2	THE SET IS SHOWN WIRED FOR SIMPLEX 000 AMP. NEUTRAL SIGNAL LINE ON TERMINALS 6 AND 7 OF THE 151411 TERM. STRIP. FOR 020 AMP. NEUTRAL SIGNAL LINE MOVE THE P WIRE FROM TERMINAL B TO TERMINAL 9 OF THE 151411 TERM. STRIP. ALSO MOVE THE BL WIRE FROM TERMINAL 3 OF THE POWER RESISTOR 101810 TO TERMINAL 4									
3	FOR FULL DUPLEX OPERATION CONNECT THE SEND SIGNAL LINE TO TERMINAL 4 AND 3 OF THE 151411 TERMINAL STRIP. MOVE THE W BL WIRE FROM TERMINAL 4 TO 5 AND THE BR Y WIRE FROM TERMINAL 3 TO 5 OF THE 151411 TERMINAL STRIP									
4	ON KSR SETS ALL ASSOCIATED READER WIRING IS NOT USED									
5	ALL CAPACITANCE VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED									
6	ALL RESISTORS 1/2 WATT AND RESISTANCE VALUES IN OHMS UNLESS OTHERWISE SPECIFIED									
7	ON RD SETS USE 101830 PLUG ASSEMBLY									
8	THESE CONNECTIONS ARE MADE AS OPTIONS BY THE CUSTOMER AND/OR THE FACTORY									
9	000 AMP. SIGNAL LINE OPTION ① 020 AMP. SIGNAL LINE OPT. ON ②									
10	THIS IS AN B LEVEL UNIT THESE WIRES ARE IN THE DISTRIBUTOR CABLE OR BARNHORN IF NOTE 10 APPLIES TAPE "NO" TO BE BACH "HERE" WIRES.									
12	THIS FUSE NOT INCLUDED ON SOME SETS. FUSE VALUES ARE AS FOLLOWS									
	<table> <tr> <th>TRANSFORMER</th><th>FUSE</th><th>PART NO.</th></tr> <tr> <td>101810</td><td>1/2 AMP SL BL</td><td>117176</td></tr> <tr> <td>102851</td><td>8 TO AMP SL BL</td><td>102380</td></tr> </table>	TRANSFORMER	FUSE	PART NO.	101810	1/2 AMP SL BL	117176	102851	8 TO AMP SL BL	102380
TRANSFORMER	FUSE	PART NO.								
101810	1/2 AMP SL BL	117176								
102851	8 TO AMP SL BL	102380								
13	WIRING SHOWN AS PA IS FOR EVEN PARITY KEYBOARD									
14	FURNISH 115V AC @ 10% 80 CYCLE EXCEPT 50 CYCLE ON 33748 TAN KSR SETS, 33742 TA1, 70P, 48A SETS AND 33740 RD SETS.									
15	APPROPRIATE FUSE IN 102102 FUSEHOLDER NOT INCLUDED IN EARLY SETS									
	<table> <tr> <th>MODEL</th><th>FUSE VALUE</th><th>FUSE NO.</th></tr> <tr> <td>102241</td><td>2 0 AMPS</td><td>138538</td></tr> <tr> <td>102287</td><td>1 8 AMPS</td><td>329248</td></tr> </table>	MODEL	FUSE VALUE	FUSE NO.	102241	2 0 AMPS	138538	102287	1 8 AMPS	329248
MODEL	FUSE VALUE	FUSE NO.								
102241	2 0 AMPS	138538								
102287	1 8 AMPS	329248								
16	<p>NETWORK 153631</p>									
17	80 CYCLE READER TRIP COIL RESISTANCE IS 830-50 50 CYCLE READER TRIP COIL RESISTANCE CHANGED FROM 830-50 TO 780-50 FOR IMPROVED 50 CYCLE OPERATION									
18	LOW PAPER ALARM CONTACTS NOT FOUND ON ALL UNITS. CONTACT RATING 4 AMP AT 30V DC									
19	TO CUSTOMER SUPPLIED ALARM									
20	AA, BB, AJ, AM. REFER TO MANUAL READER. BA, BB, BJ, BK. REFER TO AUTOMATIC READER									
21	MAY NOT BE FOUND ON EARLY UNITS									
22	3374CB TO BE WIRED FOR .020 AMP. SIGNAL LINE OPERATION									

NOTE: REVISION INFORMATION MUST ALSO BE REFLECTED ON THE ISSUE CONTROL RECORD, WHICH IS PART OF THIS 9 D

## REVISIONS

SEE ISSUE CONTROL RECORD FOR  
COMPLETE LIST OF SHEETS  
COMPRISING THIS W D

### APPROVALS

D AND R	E OF
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PROD. NO. 0393 WD

DATE 4-24-83

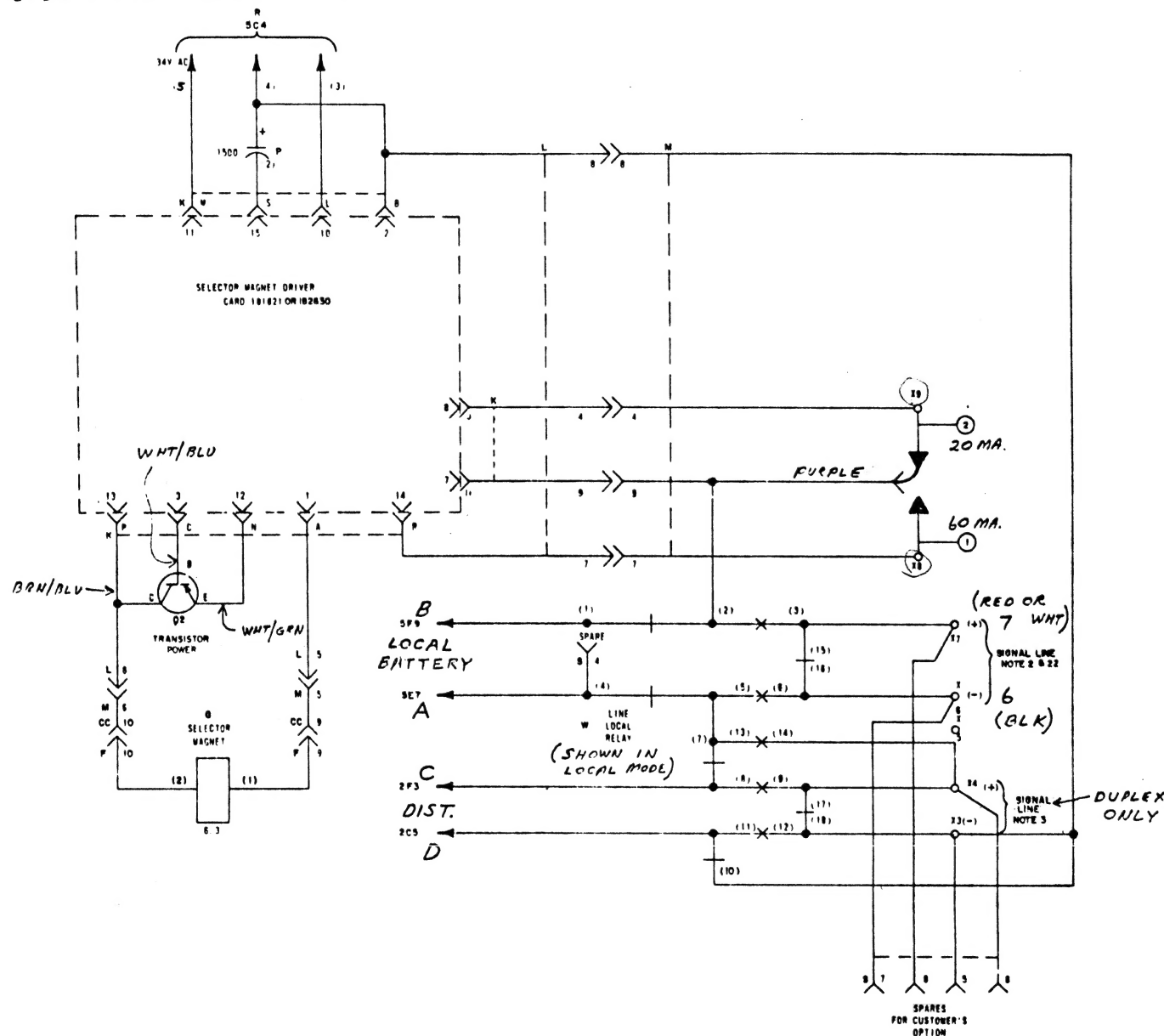
FILE NO. 2-39 192/193A

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ENCL. AS	APPRO.
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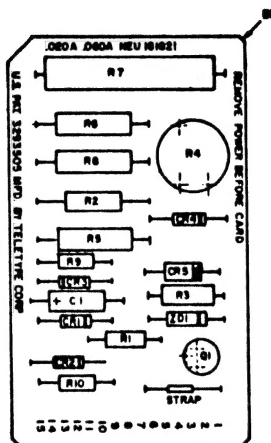
**TELETYPE**  
**CORPORATION**

6353WD



NO.	NOTES
1.	MASTER ARTWORK NO. 8808101 FOR PRINTING SCREEN IS AVAILABLE IN R&D OFFICE SERVICE SECTION.
2.	RAISE R2 5, 6, 7, 8 - 1/32 TO 1/16" ABOVE CIRCUIT CARD.
3.	TO FACILITATE MANUFACTURE THE COMPONENT LAYOUT WAS CHANGED INCLUDING R1 AND CR 5 WHICH WAS CHANGED FROM VERTICAL MOUNTING AND THE ADDITION OF 336470 STRAP

SEE NOTE 2



**CIRCUIT DESCRIPTION**

THE SELECTOR MAGNET DRIVER CIRCUIT IS POWERED FROM A SOURCE OF 117 VOLT ALTERNATING CURRENT THROUGH A STEP DOWN ISOLATION TRANSFORMER. DIODES CR1 AND CR2 PROVIDE FULL WAVE RECTIFICATION OF THE REDUCED VOLTAGE TO 28 VOLTS DC AT TERMINAL 15. THE CIRCUIT COMMON IS CONNECTED TO TERMINAL 2 AND A POWER SUPPLY FILTER CAPACITOR IS CONNECTED BETWEEN TERMINALS 2 AND 15.

THE DIRECT CURRENT SIGNAL LINE CIRCUIT IS CONNECTED THROUGH TERMINALS 14 OR 8 AND 2 DEPENDING ON LINE CURRENT. TERMINAL 7 STRAPPED EXTERNALLY TO TERMINAL 14 OR 8, DEPENDING ON LINE CURRENT.

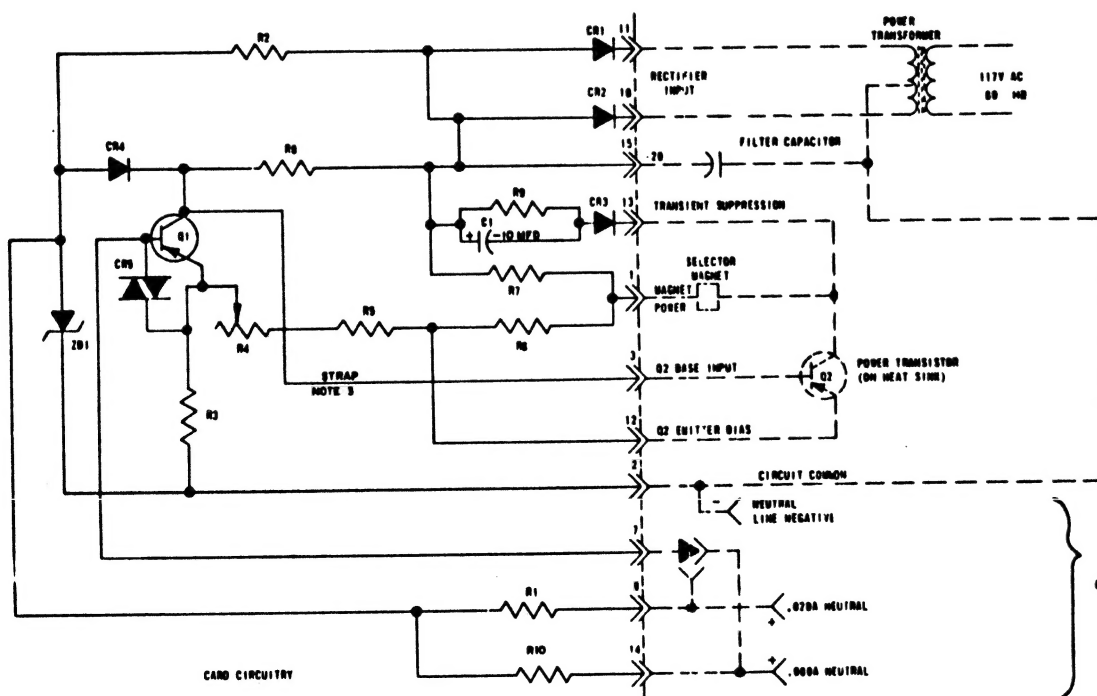
IN THE MARKING CONDITION, Q1 IS OFF BIASED WITH Q1 OFF. THE BASE OF Q2 WILL BE CLAMPED AT THE ZENER REFERENCE VOLTAGE BY DIODE CR4. THIS VOLTAGE CLAMP IS THEN TRANSLATED TO CURRENT REGULATION BY THE TRANSITION ACTION OF Q2. THE REGULATED MAGNET CURRENT IS ADJUSTED TO .500 AMPERES BY RHEOSTAT R4.

WITH THE SIGNAL LINE IN THE OPEN OR SPACING CONDITION, Q1 IS TURNED ON BY BASE CURRENT SUPPLIED THROUGH RESISTOR R1 OR R10. THE POTENTIAL AT THE COLLECTOR OF Q1 WILL BE NEAR ZERO OFF-BIASING Q2 WITH Q2 OFF. NO SELECTOR MAGNET CURRENT FLOWS, ALLOWING THE MAGNET TO RELEASE. DURING THE TURN OFF OF Q2, THE INDUCTIVE TRANSIENT DEVELOPED AT THE COLLECTOR IS SUPPRESSED BY THE NETWORK CONSISTING OF CR3, R9 AND C1.

"SNAP-ACTION" IS SUPPLIED TO THE CIRCUIT TRANSITIONS BY FEEDBACK IN THE EMITTER CIRCUIT OF TRANSISTOR Q1.

NO RECOMMENDATION SYMBOL REQUIRED PER MR 2000.

CONSTANT CURRENT .500 AMP SELECTOR MAGNET DRIVER



MOD. 33

CIRCUIT BOARD EC				
REF DESIG	TELETYPE PART NO	TOTAL QTY	NAME AND DESCRIPTION	LOCATIONS FUNCTION
R1	102770	1	RESISTOR 420 OHMS 1/2W	Q1 AMP SWITCHING
				FOR Q2A NEUTRAL
R10	102707	1	RESISTOR 135 OHMS 1/2W	Q2 AMP SWITCHING
				FOR Q2A NEUTRAL
				LINE
R2	101809	1	RESISTOR 330 OHMS 2.5W	ZENER CURRENT
				LIMITING
R3	102770	1	RESISTOR 0.82 OHMS 1/2W	COMMON EMITTER BIAS
R4	102770	1	RHEOSTAT 2 OHMS 2.5W	OUTPUT CURRENT
				ADJUST
R5	101717	1	RESISTOR 8 OHMS 5W	Q2 EMITTER BIAS
R6	102770	1	RESISTOR 0.70 OHMS 4W	Q2 EMITTER BIAS
R7	102772	1	RESISTOR 14 OHMS 10W	Q2 COLLECTOR LOAD
R8	102627	1	RESISTOR 360 OHMS 4W	Q1 COLLECTOR LOAD
R9	102770	1	RESISTOR 150 OHMS 1/2W	Q2 COLLECTOR
				TRANSIENT LIMITING
CR1	102570	2	DIODE 1N3193	POWER RECTIFIER
CR2	102570	2	SAME AS CR1	POWER RECTIFIER
CR3	101819	2	DIODE 1N4002	COLLECTOR TRANSIENT
				LIMITING
CR4	101819	1	SAME AS CR3	VOLTAGE CLAMPING
CN5	170804	1	VARIATOR 100A	INPUT PROTECTION
ZD1	102774	1	DIODE ZENER 4.7V 5.1W	REFERENCE
C1	102620	1	CAPACITOR 10 MFD 350 VDC	COLLECTOR TRANSIENT
				LIMITING
Q1	101871	1	TRANSISTOR HIGH GAIN	INPUT SWITCH
				NOTE 3
	336470	1	STRAP	NOTE 3
EC	101823	1	CIRCUIT BOARD ETCHED	

181821

REVISIONS

ISSUE	DATE	AUTH. NO
1	4-19-65	06501
2	9-19-66	000 6
3	11-23-66	000 6-1
4	5-3-67	93552
5	4-2-68	95450
6	7-3-68	95450
7	11-8-68	95450
8	12-20-68	96766
9	3-20-72	970
10	3-20-72	970
11	3-20-72	970
12	3-20-72	970

APPROVALS

R AND D  
HJK

E-NUMBER

PROD NO 101821

DATE 4-20-65

R&D FILE 2-30/52-53AA

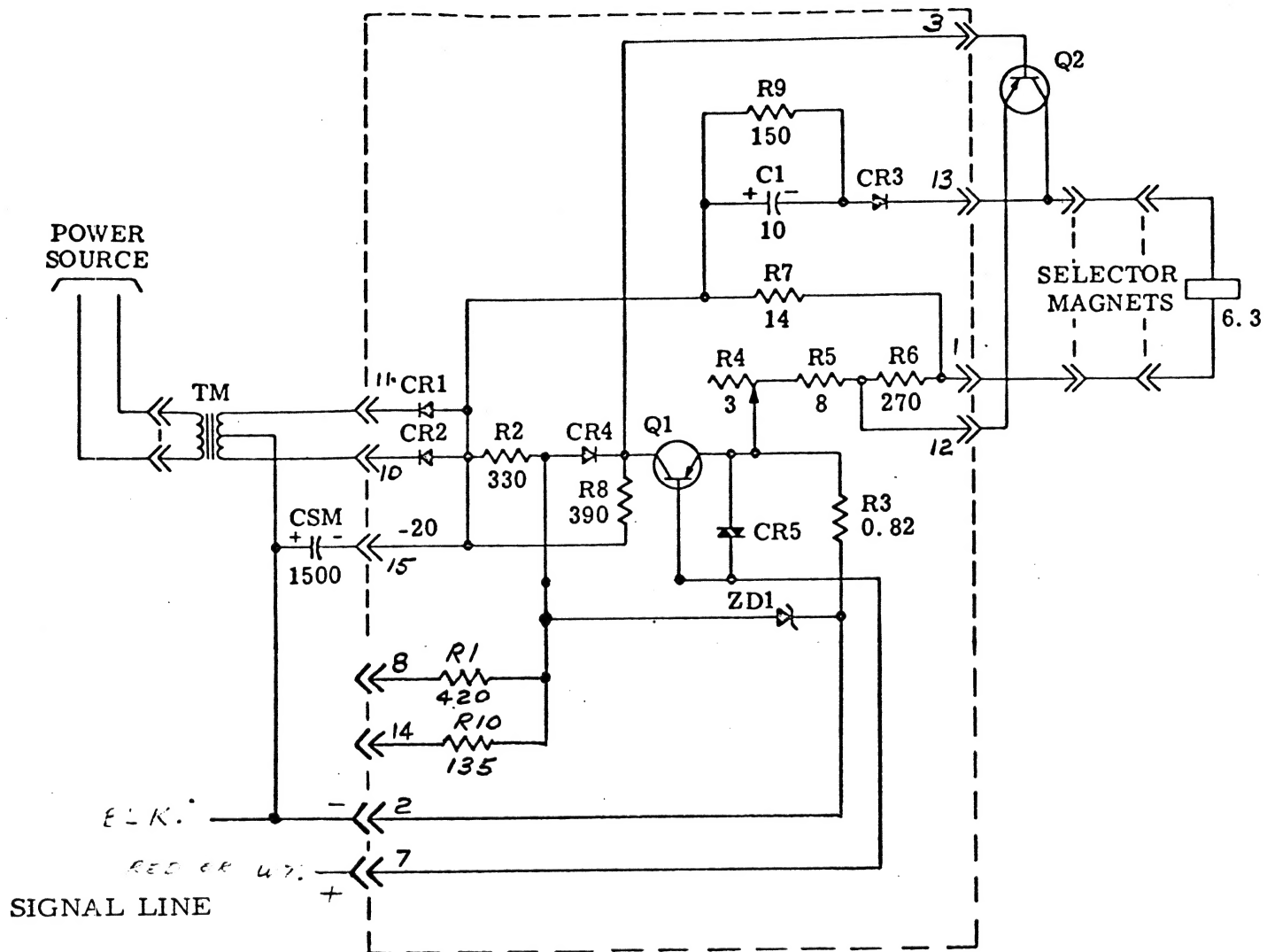
DRAWN JER-C6 CHRD HJK

ENGD AS-PPS APPD JMK

TELETYPE  
CORPORATION

181821

# Model 33 Selector Magnet Driver Circuit.



TELETYPE PART NO. 181821

For 20 MA line, pin 7 is tied to pin 8.  
For 60 MA line, pin 7 is tied to pin 14.

Transistor Q1      On for space ( open line )  
                         Off for mark

Transistor Q2      Off for space ( open line )  
                         On for mark